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REPORT

OF THE

Board of State Engineers

OF THE

STATE OF LOUISIANA

TO

HIS EXCELLENCY, NEWTON C. BLANCHARD,

GOVERNOR OF LOUISIANA,

FROM

APRIL 20, 1906, to APRIL 20, 1908.

BATON ROUGE
THE DAILY STATE PRESS
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REPORT

OF THE

Board of State Engineers

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., April 20, 1908.

To His Excellency, Newton C. Blanchard, Governor of Louisiana:

SIR—The Board of State Engineers has the honor to submit for your Excellency's information the following report, with accompanying appendices, covering the period from April 20, 1906, to April 20, 1908.

DUTIES AND PERSONNEL OF THE BOARD.

The Board of State Engineers was created by Act 33, approved February 10, 1879. The duties of the Board, as defined by this Act, are to make surveys of water courses, public works and levees of the State; to "report to the Governor of the State the improvements necessary and levees to be constructed, which are of prime importance to the State at large"; to furnish estimates and specifications of the work so required; to examine and measure the work recommended by the Board, and done under contracts made by the State, and to certify the amount of payments due for work thus executed."

Under the provisions of later laws, the Board has been constituted, in general terms, the engineers and advisers of the following named Boards of Levee Commissioners so far organized in the State, viz.:

1. The Fifth Louisiana Levee District, by Act 44 of 1886.
2. The Tensas Basin Levee District, by Act 59 of 1886.
3. The Red River, Atchafalya and Bayou Boeuf Levee District, by Act 79 of 1890.
4. The Pontchartrain Levee District, by Act 95 of 1890.
5. The Atchafalaya Basin Levee District, by Act 97 of 1890.
6. The Lafourche Basin Levee District, by Act 13 of 1892.
7. The Lake Borgne Basin Levee District, by Act 14 of 1892.
8. The Caddo Levee District, by Act 74 of 1892.

9. The Bossier Levee District, by Act 89 of 1892.

10. The Buras Levee District, by Act 18 of 1894.

11. The Cat Island Levee District, by Act 110 of 1894.

12. The Grand Prairie Levee District, by Act 24 of 1898.

13. The Plaquemines Parish East Bank Levee District, by Act 7 of 1902.

14. The Courtableau Levee District, by Act 166 of 1902.

15. The Red River and Bayou des Glaizes Levee and Drainage District, by Act 107 of 1904.

16. The Saline Levee and Drainage District, by Act 80 of 1906.

17. The North Bossier Levee District, by Act 138 of 1906.

18. The Orleans Levee District. In the case of this District, created by Act 93 of 1890, the only reference to the Board of State Engineers is as follows, viz.:

"Section 6. Be it enacted, etc., That the said Board of Levee Commissioners, as to location, construction and repairs of all levees necessary to protect said district, shall first have the approval in writing of the State Board of Engineers."

Later on, by Acts 79 of 1892, and 140 of 1900, the Board of Commissioners of the Orleans Levee District was required to have the approval in writing of the Board of State Engineers, as to location, construction and repairs of levees "on the river front of said District," only.

As will be noted, the Mermentau Levee District does not appear in the list of Levee Districts given at this date, Act 79 of 1904, by which it was created, having been repealed by Act No. 6 of 1906.

The list given, further shows the creation of two additional levee districts, "The Saline Levee and Drainage District" and the "North Bossier Levee District."

Following, a list of general laws specially calling for other duties by the Board of State Engineers, will be found, viz.:

Relative to the New Basin Canal and Shell Road: Act 144 of 1888. "Section 26. Be it further enacted, etc., That for any repairs and improvements to be made on said New Basin Canal, the Governor shall, upon the application of said Board of Control, direct the Board of State Engineers to furnish such lines and levels, plans and estimates as may be considered necessary for the proper and efficient execution of the work, and the said Board of Engineers shall make such reports, from time to time, to the Governor, as will show the condition and progress of such improvements and repairs."

Relative to Steam Railroads Operating on the Public Levees:

Article 239, Constitution of 1898: "The Boards of Levee Commissioners of the several levee districts, when authorized so to do by the Board of State Engineers, shall have full power and authority to contract with and permit any steam railroad corporation to construct, maintain, freely use and operate on the public levees, a railroad track or tracks; the supervision, control and general police power over such levees, however, to remain in and with the several levee boards."

Relative to Road Districts: Article 294, Constitution of 1898: "The State Board of Engineers, whenever called on so to do, shall furnish the different road districts with plans and specifications for public roads, and such assistance and advice as will tend to create a uniform system of public roads throughout the State."

Relative to Drainage Districts: Act 61 of 1904, Section 1: "Be it enacted by the General Assembly of the State of Louisiana, That the various Levee and Drainage Districts of this State shall have control over all public drainage channels within the limits of their respective districts and for a space of one hundred feet on each side thereof, selected by the District and recommended and approved by the Board of State Engineers, whether such drainage channels have been improved by the Levee or Drainage District, or have been adopted without improvement as necessary parts of or extensions to improved drainage channels; and shall have authority to adopt rules and regulations for preserving the efficiency of said Drainage Channels."

Act 103 of 1906. "Section 1. Be it enacted by the General Assembly of the State of Louisiana, that in addition to the duties already prescribed by law, it shall be the duty of the Board of State Engineers to make such preliminary surveys and other surveys and to perform such services as may be required by the Board of Commissioners of any drainage district in the State of Louisiana, for the construction of ditches or canals, or other public works necessary for drainage purposes in any drainage district in this State."

This Act further provides that any and all expenses incurred by the Board of State Engineers in the perfomance of such services shall be paid in cash by the drainage districts requiring them.

Relative to the Natural Gas Fields of the State: "Section 2. That whenever such owner or proprietor or person in possession of such wild, or uncontrollable, wasteful or wastefully burning natural gas well, shall be notified to close, cap or plug same, or otherwise prevent the escape and waste or wasteful burning of natural gas

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therefrom, he shall in good faith commence the work of so closing or capping or plugging the same, in order to prevent the escape and waste or wasteful burning of natural gas therefrom, within five (5) days from the receipt of such notice, the Governor, on written complaint of any person, firm or corporation, having an interest in the stopping, plugging or closing of such natural gas well, shall direct the Board of State Engineers to take charge of the work of closing such wild or uncontrollable or wastefully burning natural gas well, and the Board of State Engineers shall then proceed at once to cap or close or plug the same or otherwise prevent the wasteful escape or wasteful burning of natural gas from such well, at the expense of the owner or proprietor thereof, etc."

At one time or another, during the past two years, the Board of State Engineers has been called upon to render service under each and all of the foregoing Acts, requiring, from its members, in addition to actual field work, a great number of tours of inspection, and the submission of numerous reports and much correspondence, containing information and advice. The most important of these reports and correspondence are reproduced in Appendix "B."

Though not specifically referred to in the Acts of the General Assembly of the State, governing the operations of the Atchafalaya Basin and Lafourche Levee Boards, in the matter of constructing a Lock in Bayou Lafourche, near its head at Donaldsonville, and in improving said stream, in the interest of navigation and fresh water, the Board of State Engineers has continued, as called upon by the Joint Organization, composed of the members of those two Boards, provided for under Act No. 9 of 1900, to make numerous inspections, surveys, etc., with plans and specifications necessary for the advancement of the various steps involved in the prosecution of the project. The improvement of Bayou Lafourche is treated further on in this Report as a special subject, under the head "Bayou Lafourche." Such Special Reports and correspondence on this subject as possess any distinct and important bearing on it will also be found in Appendix "B."

In addition to the general administration of the affairs of the Department thus outlined, as specified by law and passed into practice by precedent, the Board of State Engineers has, during this period, been called into service on a number of occasions in matters of information, advice and direction by your Excellency, the United States, many of the Police Juries of the State, and other Public Bodies, involving, in a number of instances, extended inspections,

surveys and other engineering work. For special Reports along some of these lines see Appendix "B."

In this way, the constant care and attention of the members of the Board of State Engineers has been necessary, during the entire time covered by this Report, and, in addition to the office force proper, has required the regular employment of four instrument men, and, from time to time, of as many rodmen as assistants in the field. On occasions, too, the employment of men in other capacities, both in the field and in the office, was demanded.

With direct reference to the members of the Board of State Engineers themselves, their attention has, as heretofore, been directed to the affairs of all the districts, and to duties in any of them as occasion required. As a matter of system and convenience, however, the engineering work in the levee districts generally, has received the special attention of and been directed by them about as follows, viz.: In the Pontchartrain, the Lafourche Basin, the Lake Borgne Basin, the Buras, Grand Prairie, and the Plaquemines Parish East Bank Levee Districts, by Assistant State Engineer Lewis; in the Atchafalaya Basin Levee District, for the improvement of Bayou Lafourche, under the Joint Organization of the Atchafalaya Basin and Lafourche Levee Districts, and for the Board of Control of the New Basin Canal and Shell Road, by Assistant State Engineer Perrilliat; in the Fifth Louisiana Levee District and the Tensas Basin Levee District, by Assistant State Engineer Robertson; in the Caddo, Bossier, North Bossier, Red River, Atchafalaya and Bayou Boeuf Levee Districts, Red River and Bayou des Glaizes Levee and Drainage District, and the Saline Levee and Drainage District, by Assistant State Engineer Lombard; and in the Orleans Levee District, by Chief State Engineer Kerr.

Levee Work of the Past Two Years.

The work of improving the public levees in Louisiana, and of those in the lower counties of Arkansas tentatively protecting parts of Louisiana, has steadily continued to advance during the period since the last biennial report of the Board of State Engineers to Your Excellency, the several levee districts, the State and the United States each contributing to the full extent of its powers and available means towards the accomplishment of comprehensive results.

However, notwithstanding this well recognized advance in the betterment of the lines of levee in the State, and in that part of

Arkansas aiding in the protection of Louisiana, standard grades and cross sections along all the necessary lengths of levee line, and safe locations at all points, along the streams leveed have not yet been reached, and cannot well be reached in anything like the near future.

Until bank protection, under the direction and at the expense of the National Government, becomes more general, caving, requiring the construction of new loops, in most instances, with the lapse of time, of greater and greater magnitude, will at best continue to call for as large expenditures in the future as in the past; many miles of levees, where, from lack of immediate resources in the past, it was necessary to sacrifice cross section to grade, must be materially enlarged; and, in the light of modern progress and processes, the entire system must, sooner or later, be surrounded by a far more comprehensive plan for its care, preservation and maintenance than has so far engaged the attention of the levee authorities.

The contracts and agreements for levee work, undertaken during the past two years alone, by the levee districts and the State of Louisiana, with 28 contracts entered into previous to April 20, 1906, and still in force on that date, numbered 136, involving the handling of 14,393,658 cubic yards of earthwork, estimated to cost $3,036,-449.50.

The total amount and cost of levee work actually done under these contracts (not taking into consideration percentages retained until completion) between April 20, 1906, to April 20, 1908, by the levee districts and the State of Louisiana, with that done by the United States, is shown in the following table:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the Levee Districts.....	42.57	55.37	5,774,569	$1,271,278.75
By the State of Louisiana...	20.61	27.04	2,870,590	603,649.35
By the United States.....	13.97	38.68	3,765,552	838,891.32
Aggregates	77.15	121.09	12,410,711	$2,713,819.42

The foregoing, divided as to locality, is as follows:

LOCALITY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
IN ARKANSAS:				
On the Arkansas River.....	1.18	.....	109,739	$ 23,493.45
On the Mississippi River....	4.85	15.26	1,200,226	273,415.30
IN LOUISIANA:				
On the Mississippi River....	31.73	82.00	8,297,287	1,927,921.50
On the Red River.....	28.27	3.51	1,882,540	332,288.18
On the Atchafalaya River...	3.84	4.83	436,622	88,367.43
On the Gulf Coast.....	7.19	13.78	455,892	58,282.74
Interior Streams	0.09	1.71	28,405	10,050.82
Aggregates	77.15	121.09	12,410,711	$2,713,819.42

The amounts given in the foregoing tables do not include those involved in the drainage work done, during this period, by the Red River, Atchafalaya and Bayou Boeuf Levee District, costing $42,-935.98, on which class of work some $96,285.55 worth still remains to be done under existing contracts. Nor do they include the work for the improvement of Bayou Lafourche, for navigation and the supply of fresh water, undertaken by the Joint Organization of the Atchafalaya Basin and Lafourche Levee Districts, on which some $317,253.20 has been expended up to date.

In addition to the above, there still remains, under contracts of the several levee districts and of the State, in force at this time, an amount of levee work to be done estimated to aggregate not less than 4,571,727 cubic yards, and to cost (in addition to the percentages retained until completion) not less than $965,612.34. (See Appendix "A" for detailed statement.)

A considerable amount of work has also, as usual, been done in and expenditures incurred by the several levee districts and by the United States for weed cutting, minor repairs, auxiliary works of various descriptions, and for wooden revetments. Information upon

which to base positive statements in regard to all these particulars is not at hand, but the sum involved is considerable.

Owing to the continued betterment of the lines of levee, expenditures for protection work during high water have continued to diminish in all the levee districts. In some of them they have been reduced to comparatively insignificant amounts.

Details relative to the location, character, extent and cost of the levee work of the past two years will be found in the paragraphs of this report headed "The Levee Districts", and in tabular form in Appendix "A".

The Levee System.

The principal lines of continuous levee at present protecting the alluvial lands of Louisiana against overflow are as follows:

1. From the highlands near Pine Bluff, Ark., down the right bank of the Arkansas River, to within about five miles of the mouth of the old Arkansas River, a distance of about 87 miles, extending through the Linwood-Auburn Levee District of Jefferson county, the Linwood-Auburn Levee District of Lincoln county, the Red Fork Levee District, and that part of the Desha Levee District above Arkansas City, some 71.4 miles of which is leveed continuously. At the lower end of this continuous line, an extension, some 2.6 miles in length, is under contract by the United States Government, running along Dry Bayou towards the main line of the levees constituting the head of the Mississippi River levees. This extension, when completed, will reduce the gap between the Mississippi and Arkansas River levee system to about 3.5 miles. This extension, at this date, has about 63 per cent of its final contents in position.

2. From Costello's Gin, a point on Amos Bayou—about five miles south of Red Fork and about twelve miles west of the mouth of the Arkansas—a continuous line of levee extends down the left bank of Amos Bayou about five miles; thence—crossing Boggy—to the right bank of Cypress Creek, about 1.5 miles; thence about six miles down the right bank of Cypress Creek to Lucca Landing, on the Mississippi River, where it joins the levee system on the right bank of the Mississippi River; and thence continues down through Desha and Chicot Counties, Arkansas, and the Fifth Louisiana Levee District to Bougere, in Concordia Parish, about 295 miles below by the present levee line; thus making one unbroken line from Costello's Gin, Arkansas to Bougere, La., about 307.5 miles in length.

At this point, a gap in the levee line, known as the Bougere Crevasse, has existed since 1866, but below this gap, now reduced to a width of some 2.0 miles, the public levee line is, at this date, again continuous for a distance of about 14.5 miles to Point Breeze, which latter point is within about 8.0 miles of the mouth of Old River, generally referred to as the mouth of Red River. This point will no doubt, as it should, constitute the lower terminus of this system of levees, until such time as the project for divorcing the Red and Atchafalaya Rivers from the Mississippi River takes definite shape and is finally provided for.

Contracts covering the balance of the line required to close the gap in the line of public levee at Bougere were let by the United States during this period, as anticipated in the last report of the Board of State Engineers, and marked progress has been made towards the consummation of that most desirable end, some 5.18 miles of the work contemplated having been completed. The completion of the entire line of new levee around Bougere Crevasse by the United States, some 7.28 miles in length as projected, seems reasonably assured before the Spring floods of 1909.

So far this year, no flood water from the Mississippi River has escaped through Bougere, due to the fact that the Texas and Pacific Railway Company has finally succeeded in filling in its trestle work across the Crevasse to a grade reported to be 2.0 feet above high water in the Mississippi River, with a crown or roadway 15 to 20 feet wide, and side slopes about 3 and 3 to 1. It is, therefore, possible that, unless some unforeseen mishap occurs, to this railroad embankment; and the high water of this year in that locality does not exceed that of the past, there may be no flow through Bougere Crevasse this year, a circumstance which will tend to materially assist in the earlier completion of the levee line proper by the United States.

3. From Torras Landing, at the mouth of Red River, (or more properly the mouth of Old River) the levee extends down the right bank of the Mississippi River, without break or interruption, to the outlet known as The Jump; that is, to within about 10 miles of the Head of the Passes, a length of 289.7 miles.

And from the same point at Torras Landing, the levee line runs along the south bank of Old River 7.0 miles to Barbres Landing; and thence down the left bank of the Atchafalaya River, to and across Sherman's Bayou, a length of about 42.1 miles.

These lines thus form a continuous system on the Atchafalaya and Old and Mississippi Rivers, 338.8 miles in length.

4. On the left bank of the Mississippi, the levee line extends uninterruptedly from Baton Rouge to what is known as the Lucas Canal, about 7.0 miles below Fort St. Philip, a length of about 217.5 miles.

5. The upper levee system of the Caddo Levee District, on the right bank of Red River, extends from Blanton Bluff, Ark., about 1.5 miles above the Louisiana line, to Cash Point Place, a length of about 46.5 miles of levee.

6. The lower system of the Caddo Levee District—also on the right bank of Red River—extends from the Bluffs on the North side of Bayou Pierre to the lower limits of Caddo Parish, a length of about 35.0 miles.

7. The levees of the Bossier Levee District, on the left bank of Red River, extend from Hurricane Bluff to the old Dennison Plantation, a length of about 54.5 miles.

Below this, the natural banks of Red River, in Bossier Parish, are, except at Ninock and Swift Chute Bayous, generally high enough, as compared with the high water of the past, to restrain all but very extreme floods, occurring, in the light of history, at long intervals of time.

Both of these streams, however, are now closed by levees.

8. The upper levee system of the Red River, Atchafalaya and Bayou Boeuf Levee District is continuous from the highlands on Bayou Rapides—about 1.5 miles above the mouth of the Bayou—down the Bayou to its junction with Red River, at Alexandria, about 1.5 miles; thence down Red River to the Avoyelles Prairies, at David's Ferry, 35.3 miles in length, or a total for the upper system of 36.8 miles.

9. The lower system of the Red River, Atchafalaya and Bayou Boeuf Levee District is continuous on the right bank of Bayou des Glaizes, from "The Junction" about 9.0 miles above Moreauville, down the Bayou to its junction with the Atchafalaya River, at Simmsport, about 48.0 miles; and thence down the Atchafalaya River to Bayou Latanier, or Krotz Springs, about 11.5 miles below Melville, a length of about 37.0 miles, making a total of 85.0 miles for the lower system, and an aggregate of 121.8 miles for the entire district.

10. The levee system of the Red River and Bayou des Glaizes Levee and Drainage District, contemplated under the Act of incorporation of the District, will involve the construction of lines of levee on Red River, the Atchafalaya River, and on Bayou des Glaizes, aggregating probably 125.0 miles in length. Active levee building in the District, on the lines proposed, began in the early part of 1905, resulting in the completion to date of about 21.0 miles of work extending from David's Ferry to Lake St. Agnes.

11. The levee system of the Saline Levee and Drainage District, organized under authority of law in 1906, contemplated under the Act of incorporation of the District, will involve about 17.5 miles of levee on the left or East bank of Red River, in Avoyelles Parish, extending from near Cassandria to Saline Bayou. Active levee building in the District began in the early part of 1907, resulting in the completion up to this time of about 10.5 miles of work, extending from Cassandria to Point Maigre Settlement.

12. The levee system of the Plaquemines Parish East Bank Levee District, is intended to exclude the overflow waters of the Gulf of Mexico from that portion of the Parish of Plaquemines included in the Lake Borgne Basin and Grand Prairie Levee Districts, extending from the upper line of Harlem Plantation to the upper bank of Cuselich Canal, on the property of Peter Cuselich, below Old Quarantine Station, and, when completed, will be some 33.0 miles in length. Of this length of line, about 20 miles, including three cross levees, have, during the past two years, been completed, extending from Harlem Plantation to Nestor Canal.

The aggregate length of levee lines thus described is 1259 miles. In addition to these, there are a number of lengths of levee line in comparatively isolated localities, and on interior streams, some parts of which are not located in any regular levee district, amounting to about 330.3 miles, making a total length of levee lines more or less protecting Louisiana, at this time, of 1,589.3 miles; that is, 155.7 miles in the State of Arkansas, and 1,423.6 miles in Louisiana, divided, according to territory and streams, as follows:

LENGTH OF LEVEE LINES IN LOUISIANA AND IN THAT PART OF ARKANSAS AIDING IN THE PROTECTION OF LOUISIANA. (April 20, 1908).

Name of State Levee Districts.	Miles on Mississippi River	Miles on Red River	Miles on Atchafalaya River	Miles on Bayou Lafourche	Miles on Other Streams	Total Miles
Tensas Basin					(a) 40.0	40.0
Fifth Louisiana	239.5				(b) 39.0	278.5
Atchafalaya Basin	129.5		42.1	(c) 75.0		246.6
Pontchartrain	125.9 (d)					125.9
Lafourche Basin	119.6			(e) 74.1		193.7
Orleans	26.5				(f) 48.0	74.5
Lake Borgne Basin	48.3					48.3
Grand Priarie	30.6					30.6
Plaquemines Parish					(g) 19.9	19.9
Buras	33.8					33.8
Caddo		81.0			(h) 9.0	90.0
Bossier	..	54.3				54.3
Red River, Atchafalaya and Bayou Boeuf		36.8 (i)	36.8		(j) 48.0	121.6
Red River and Bayou des Glaizes		21.0				21.0
Saline		10.3				10.3
North Bossier (k)						
Courtableau (l)						
Cat Island (m)	12.8					12.8
State of Arkansas	71.8				(n) 83.9	155.7
Outside of Levee Districts...		31.8				31.8
Total by Streams	838.3	235.2	78.9	149.1	287.8	1589.3

(a). Includes 10.5 miles on Ouachita River, 17 miles on Black River, 13 miles on Little River.

(b). Includes 12.7 miles on Black River, and 36.3 miles on Tensas River.

(c and e). These systems, due to closure of Bayou at head, pending construction of lock, in disuse at this time. Also since closure of Bayou, cut through in many places for easy access to Bayou and for connecting canals.

(d). Includes 0.27 miles of cross levee at head of system.

(f). Rear levees, etc.

(g). Along Gulf Coast, Parish of Plaquemines, includes three cross levees.

(h). All on Bayou Pierre. In disuse since closure of Tones Bayou.

(i). Includes 1.5 miles on Bayou Rapides.

(j). All on Bayou des Glaizes.

(k). No system yet begun.

(l). Not in operation.

(m). Fragmentary, built before organization of district, district not in operation.

(n) Includes 71.4 miles on Arkansas River from Pine Bluff, Ark., to lower end of system, and 12.5 miles on Amos Bayou and Cypress Bayou above head of Mississippi River system.

The Construction of Levees.

In the construction of levees in Louisiana, and that part of Arkansas affecting Louisiana, by the districts and the State, the following general specifications usually maintain, viz:

The removal from the ground to be occupied by the embankment of all trees, stumps, logs, roots, stalks, weeds, grass, trash, and perishable matter of every kind, and the plowing or spading up of the entire surface so occupied; the cutting of a muck ditch, to such depth and size and in such places—usually on the river side of the line of station stakes indicating the axis of the location of the embankment—as may be prescribed by the Engineer in Charge; the grubbing up by the roots of all trees, and stumps coming within the base of the embankment, and three feet beyond the base; the removal of all buried logs, brick or walls, and other material considered by the Engineer in Charge as unsuitable; refilling all excavations made by grubbing or by removal of unsuitable materials, with solid earth up to the level of the natural surface, such filling not to be paid for as excavation (except in special cases when so directed by the Engineer in Charge) but as a part of the clearing and grubbing to be done as incidental or auxiliary work, payment for which shall be included in the price per cubic yard of embankment specified by contract; the cleaning of all ditches crossing the embankments, and filling them with solid earth up to the natural surface of the ground to a distance of twenty feet from the base of the embankment on the land side, where no "banquettes" are prescribed, and to the width of the berme on the river side; if required by the Engineer in Charge, the clearing, grubbing, preparation of base and cutting of muck ditch, and the refilling of muck ditch throughout the whole length of the embankment, shall be done before the embankment be begun; the cutting down to the level of the ground of all trees and stumps within twenty-five feet of the base of the levee on the land side, unless otherwise directed by the Engineer in Charge, and leaving the ground clear of all fallen timber, brush and other debris or material obstructing free passage along the base of the levee on the land side for that width;

the cutting down of all trees, bushes and saplings for a width of one hundred feet on each side of the levee through woods, and, in open land, the cutting down of such trees within one hundred feet of the levee as the Engineer in Charge may direct; the use of earth only in the construction of the levee, unless other material be ordered by the Engineer in Charge; the placing of said material in layers of such thickness for the full width of the embankment, as the Engineer in Charge may direct; removing all earth from the river side of the levee, except by written permission of the Engineer in Charge, leaving a berm of the natural surface of such width as the Engineer in Charge may direct, between the narrow pits and the base of the levee, retaining an allowance for settling or shrinking of one-fifth in excess of the net height of the levee; unless otherwise directed by the Engineer in Charge, sloping all fills on the land borders of the levee not steeper than three horizontal to one vertical, restricting the depth of pits on the land side to three feet; leaving the bottom of the pits unobstructed to the side ditches; from the levee, and then limiting the depth of the pits to six feet; leaving embankments, at intervals not greater than three hundred feet, reaches of the natural surface not less than twenty feet wide, extending across the full extent of such width as may be directed by the Engineer in Charge, over the deepest part of the pit, to drainage from one part of the pit to another, leaving embankments at existing roadways or paths of the embankments, except by special permission of the Engineer in Charge; cutting such openings through the embankment as may be required by the Engineer in Charge; cutting drainage ditches in the land side of the levee, if required by the Engineer in Charge, of such dimensions and at such distance from the base of the levee as may be prescribed; planting the berm, slopes of the embankment, and borrow pits with [illegible] grass; and [illegible] grass not more than one foot apart, &c.

In the matter of [illegible] grass, the provisions [illegible] agreed by the Mississippi River Commission are [illegible], except where the latter is less than six feet above the highest water of record, in which case [illegible] six feet above the highest water of record is specified.

In the matter of [illegible] the [illegible] and [illegible] and [illegible] and

ment requires protection by revetment or not, the availability of means, etc., are in practice.

By law, banquettes are required to be built over all bayous or sloughs crossed by levees. Banquettes have also been generally prescribed across depressions of the ground in marked contrast with the general elevation of the natural surface in the vicinity of the levee; also where the general height of a levee exceeds 15 feet. Such banquettes are, as a rule, located along the land side of the line of levee, forming part of its land side base. A disposition, however, is at this time gaining favor, to as much as possible avoid the construction of banquettes, and in lieu thereof adopt flatter slopes.

Where lines of levee are generally exposed to wave wash, due to wind, the passage of steamers, etc., wooden revetments are, where practicable, and the means are available, built and maintained.

During the past two years, the United States, when called upon to protect from wave wash lines of levee built under its direction, on the "Lower Coast" (the Mississippi River, below New Orleans), has been considering various forms of revetment, notably paving the entire river side slope of the levee with a layer of concrete. So far, such paving as has been so done presents a fine appearance, and is performing its offices satisfactorily. It is, however, still in the experimental stage, and the Board of State Engineers is not yet prepared to pronounce it the best form for that class of work.

The earth utilized in building the levees of the State, by the levee districts and the State, continues to be moved mostly by scrapers drawn by mules. Wagons and graders are, in some instances, used in conjunction with scrapers. Men with wheelbarrows come next in order of volume of work accomplished, while power-driven machinery, though contributing largely towards it, can not be said to have yet taken the advanced position expected of it, and to which it would logically seem to be well adapted.

During the past two years, the work performed by the districts and the State, by the various methods employed, was (exclusive of the Orleans Levee District) as follows: By scrapers drawn by mules 64 per cent; by men with wheelbarrows 19 per cent; and by power-driven machinery 17 per cent.

The average cost of the levee work performed by the Levee Districts and the State, by all methods, during the past two years,

was (inclusive of the Orleans Levee District) 21.67 cents per cubic yard; and by the three methods named as follows: By scrapers drawn by mules 21.01 cents per cubic yard; by men with wheelbarrows 19.88 cents per cubic yard, and by power-driven machinery 17.65 cents per cubic yard.

Supervision, Care and Maintenance of Levees.

The present status of operations for the supervision, care and maintenance of levees in the State, by the levee districts and the State, is not materially different from that described in the last Report of this Board, April 20, 1906, and the references to the subject then made are so equally applicable at this time, that the Board of State Engineers takes the liberty of herein simply reproducing, with some minor corrections, its former remarks under this head, viz:

The work of construction proper having so far generally engaged and almost entirely absorbed the attention, efforts and resources of the levee districts of the State, the correlative proposition of supervision, care and maintenance has not everywhere yet received that material thought and consideration which it unquestionably demands.

It has in the past been primarily imperative, on the part of all interested, to build and to enlarge—the care and preservation of the work accomplished being generally regarded as a matter of secondary consideration, and, in consequence, has, in many localities, been up to this time more or less neglected.

The Board of State Engineers regards this to be an unwise policy to longer pursue, and urges a more serious consideration of the subject in the future.

There exists in the State, to-day, some 1,425 miles of levees, monuments to the foresight, broad mindedness, courage and energy of its people, but it cannot be recorded that the safeguards against their abuse and deterioration provided by law, and often even those which common sense alone would seem to dictate, have everywhere yet been taken advantage of, nor put into practice.

The levee districts of the State and the Police Juries of Parishes, within the levee districts, are specifically charged by law with the duty of protecting, preserving and maintaining the public levees of the State, no matter under what authority constructed; but, for the most part, in the greater number of the levee districts, the

authorities in this respect are making but partial effort, and, in some, none whatever.

The Board of State Engineers, therefore, feels it incumbent upon itself to herein lay considerable stress on this fact, and put itself on record by reiterating its often expressed views on the subject, and again urging that the time has, beyond question, arrived when these official bodies should no longer delay the serious consideration and formulation of plans for systematically, comprehensively, economically and effectively fulfilling their sworn obligations in this particular.

Systematic organization for the constant supervision, care and maintenance of the levee lines must, sooner or later, be adopted, not only by the levee districts, but by the United States as well, and the earlier the better. Work of a more or less serious character, and of greater or less extent, in one place and then another, along all the lines of levees in the State, is needed throughout the course of the year.

Without going into any specific detail about method and appliance, this should be undertaken and performed by permanent forces, suitably organized and properly equipped, on lines similar in most respects to the railroad section-gang system.

The various classes of work required, being also peculiar to the season, each class should and could be thus disposed of during the season when the best results will follow. These section gangs could be made the nucleus of high water forces in the Spring; then, upon the subsidence of the waters, of repair forces, to perform all work of a minor character incident to and following periods of high water, such as removing drift, restoring wave-wash, drainage, resodding embankments, where necessary, and collecting and storing all tools and materials. All weed cutting could, at the proper time, also be done by such gangs, the patrolling of the levees at all times as well as seeing that the laws for their preservation and maintenance are strictly and impartially enforced, and perform generally other auxiliary work, even to assisting engineering parties in field operations.

The Levee Districts.

The levee districts of this State are the result of mature development along geographic and topographic lines. More than half a century ago, after many years of varied and uncertain effort,

on the part of the riparian owners and of the State, to evolve a comprehensive system of levees to protect their interests from overflow, the General Assembly of the State advanced a project to remedy previous defects by repealing all levee laws relating to the duty of official management and construction, by, first of all, "dividing the State into several levee districts, bounded by the natural geography and topography of the alluvial lands, so that, in each district there may be a common interest in the maintenance of the levees." It was further proposed to sub-divide "each district into as many sub-districts as may be indicated by their topography, with small guard levees between them, that the accidents of crevasses may be confined, as far as is just and practicable, to the natural basins in which they may occur."

This project of the General Assembly of the State (1851), endorsed by the leading local engineers of that time, may be said to have been practically the first progressive step towards bringing into practice in this State the present comprehensive system of administration and construction that has finally so successfully brought about such a generally satisfactory condition of affairs in the matter of protection from overflow.

In the light and wisdom of this general proposition, organization, on the lines thus set forth, has spread and improved, from period to period, first tentatively, and then with confidence, especially within the last quarter of a century, until, at this time, no less than eighteen levee districts, so bounded as to assure a common interest, are distributed over the State, inspiring a common sense of security from overflow within their territorial limits. Of these eighteen levee districts, fifteen are in active operation.

All these districts possess corporate powers, exercised under the administration of Boards of Commissioners, varying in number from three to nine; and all, except the Orleans Levee District, are empowered to levy ad valorem taxes for levee purposes, not exceeding the Constitutional limit of ten mills on the dollar. The Orleans Levee District is restricted to an ad valorem tax of one mill on the dollar. Most of the districts also have power to levy assessments or forced contributions upon agricultural products raised within their territory, and upon railroads of standard gauge, while some of them, the boundaries of which touch upon the Gulf Coast and bays, may impose a local assessment or forced contributions upon oysters. All of the levee districts have authority to issue bonds. The aggregate of district levee bonds now authorized in all

the districts, is $5,990,000. of which $4,663,700. is at this time outstanding. The total assessed valuation of the same levee districts (exclusive of the Cat Island and Courtableau Levee Districts, in which no local assessments have so far been made) as shown on the tax rolls of 1907, is $298,293,674.00.

A general description of the levee districts in the State, so far authorized by law, with statistical and other information of interest relating to them, follows: It should be explained that the cost of the levee work done during the past two years, and remaining, at this date, to be done under existing contracts, shown in the following statements, is, in the first case, inclusive of, and, in the second case, exclusive of, percentages retained until completion.

1. *The Tensas Basin Levee District,* composed of the Parishes of Morehouse, West Carroll, Richland, Franklin and Catahoula, with those portions of Ouachita and Caldwell Parishes lying East of the Ouachita River. As the overflows to which the district is most liable result from flood waters escaping from the Arkansas and Mississippi Rivers, in Arkansas, authority in law is given to it to apply its resources to the construction, improvement and maintenance of such lines of levee in the State of Arkansas, South of the Arkansas River, as, in the judgment of the Board of Commissioners, concurred in by the Board of State Engineers, are recognized to possess a material bearing upon the protection of the district.

The United States "Upper Tensas District" includes the same levee line, and the larger part of the levee work done on it continues to be contributed by the United States.

The affairs of the district are conducted by a Board of Commissioners, consisting of seven members, one being appointed from each Parish, or part of Parish in the district.

The domicile of the Board is at Monroe, Ouachita Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the districts, and possessions, etc., thereon.

Forced Contributions: Five cents per acre on all land within the district; $60.00 per mile of standard gauge railroad; and $30.00 per mile on railroads of less than standard gauge.

In addition to the foregoing resources of the district, 10 per

cent of the General Engineer Fund ($\frac{17}{10}$ of a mill general State tax) is required by law to be set aside and expended annually in the interest of the district.

The authorized bonded debt of the district is $150,000, of which $65,000 is, at this time, outstanding.

The assessed valuation, on the tax rolls for 1906 and 1907, was $2,830,261, and $3,042,840, respectively.

The amount and cost of the levee work done in the district, and that part of Arkansas affecting the district, during the past two years, by the district, and the United States, is approximately as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District	1.29	6.57	428,897	$ 93,642.12
By the United States	4.83	8.69	890,668	205,642.63
Totals	6.12	15.26	1,319,565	$299,284.75

The amount and cost of the levee work still remaining, at this time, under existing district contracts, to be done, is approximately as follows: 422,212 cubic yards to cost about $113,054.47.

In addition to the foregoing, the District, during the same period, expended in minor repairs, and for the care, preservation and protection of its lines of levee generally, $1,681.12.

The United States, in bank protection work, along reaches of the Arkansas and Mississippi Rivers, in Arkansas, affecting levees in which the Tensas Basin Levee District is interested, also entered upon projects involving large outlays of money.

Act No. 59 of 1886, authorizing the organization and operation of the Tensas Basin Levee District, recites "That the Board of Commissioners of the Tensas Basin Levee District shall have the right to join in with any levee district embracing the Counties of Chicot and Desha, in the State of Arkansas, for mutual protection, in compliance with Article 210 of the Constitution." In this way, the Tensas Basin Levee District has contributed towards the

construction, improvement and maintenance of all that line of levee in Desha County, extending from Costello's Gin, on Amos Bayou Ridge, to Lucca Landing, on the Mississippi River, and thence down the Mississippi River, through Desha and Chicot Counties to the Arkansas-Louisiana line. The head of this system, at Costello's Gin, ends abruptly with a levee about four feet in height. At stages of the Mississippi River, exceeding 50 feet on the gauge at Arkansas City, a considerable flow runs around the head of this system, averaging for a distance of about 12 miles, some 3 feet in depth, and in several of the small bayous crossing the line, as much as 10 feet in depth. It has for years past been the desire of the Tensas Basin Levee District to extend this line westward from Costello's Gin to higher ground—a movement looked upon with favor by the Mississippi River Commission, a large part of Desha County and all of Chicot County. But, owing to the objections raised by the Levee Districts North of this line, it has so far been impossible to obtain rights of way to permit this. Instead strong effort has been constantly made by the same parties in interest in Arkansas to secure the construction of a cross levee to join the lower terminus of the system extending down the Arkansas River, from Pine Bluff to Jefferson Lake, with the system along Amos Bayou and Cypress Creek, at or near Boggy Bayou. This would necessitate the re-opening of Boggy Bayou, and the establishment of an extensive line of drainage work to provide relief from precipitation in the rainshed above, which, at the same time, during periods of high water in the Arkansas River, would again place the Tensas Basin Levee District at the mercy of the still inadequate line of levee along the South bank of the Arkansas River. The project for affording this relief to the territory above the Amos Bayou and Cypress Creek line of levee, whenever the junction of the Arkansas and Mississippi River levee systems be determined upon, has been investigated by the United States, showing excavation amounting to some 4,000,000 cubic yards to be required. This, at the moderate price of 20 cents per cubic yard, including clearing, etc., would aggregate some $800,000—more than the combined resources of all the levee districts interested in the movement could possibly amount to in a great number of years to come.

As a matter of course, whenever the line of levee on the Arkansas River, from Pine Bluff to the mouth of the river, has been so improved as to compare in safety with that on Amos Bayou and

Cypress Creek and the Mississippi River, in Arkansas, the objections of the Tensas Basin Levee District to the abandonment and opening up of the Amos Bayou and Cypress Creek line cannot justly maintain. But, until such be the case, in the opinion of the constituted authorities, but one proposition can possibly be entertained by the Tensas Basin Levee District—the extension of the Amos Bayou line westward to high ground, towards the cost of which the District stands ready and committed to contribute largely at any time that the extension may be agreed upon by all parties in interest.

In regard to the present condition of the line of levee on the Arkansas River, it must, in all justice, be said that the levee districts engaged in improving it, have in the past four years, by selling lands, issuing bonds and straining every resource, practically remodeled and materially improved by far the greater length of the line from Pine Bluff to Red Fork, making appreciable headway towards bringing about, at no distant day, conditions tending to harmonize the situation from every point of view.

By agreement between the United States Engineers and the Board of State Engineers, all future levee work on the Mississippi River, in Arkansas, affecting the Tensas Basin Levee District, is to be constructed to a grade four feet above the high water of 1903, with crown 8 feet wide and slopes of 3 and 3 to 1. Long lines of enlargement were, during the past two years, undertaken by the United States, the Tensas Basin Levee District and the Chicot Levee District, the latter with most commendable public spirit having appealed to the General Assembly of Arkansas for authority to issue bonds to the amount of $100,000—$50,000 to be made immediately available, and the balance when urgency demanded. This authority was granted, enabling the Chicot Levee District to materially extend its field of usefulness.

Thus, through the combined efforts of the three authorities cited, when the work of the passing season will have been completed, about 70 per cent of the line will be up to the grade named, leaving about 30 per cent of the line to be still so improved. Of this, no part of the line is at a lower grade than two feet above the highest water.

Some minor abuses, such as log rooting, stock paths, etc., exist along the line, viz., as a whole, it is in excellent shape, well sodded and free from weeds.

At Chicot, in Desha County, and Panther Forest and Grand

Lake, in Chicot County, new loops were, during the past two years, undertaken, the first by the United States and the Tensas Basin Levee District, and the latter by the United States. The two latter are completed, and about 70 per cent of the former, and in addition to all this the spur at Leland has been extended by the United States about half a mile.

It is with regret that it must be recorded that serious conditions, due to caving banks, exist at three localities along the front of the maintaining line affecting the Tensas Basin Levee District, at each of which an emergency stage has been reached. These localities are Panther Forest, Vaucluse and Grand Lake. The treatment of each involves the alternative of bank revetment, the construction of large dikes across treacherous foundations, or of long loops around the lakes, throwing out properties of great value, against, of course, the protest of riparian owners. Of these emergencies cited, that at Vaucluse is the most pressing. Unless caving is, within the season, arrested at Vaucluse, the construction of a new levee there should be begun at once. This will involve not only large outlays of money, but great length of time in construction.

2. *The Fifth Louisiana Levee District*: Composed of the Parishes of East Carroll, Madison, Tensas and Concordia.

That part of the levee line in the district, extending from the Arkansas line to a point opposite Warrenton, Miss., is included in the United States "Upper Tensas District," and that below said point, extending to the mouth of Red River, coincides with the United States "Lower Tensas District."

The affairs of the district are conducted by a Board of Commissioners composed of eight members, two from each Parish.

The domicile of the district is at Tallulah, Madison Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $100.00 per mile on railroads of standard gauge; $20.00 per mile on railroads of less than standard gauge; and $1.00 per bale on all cotton grown within the district.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.

The assessed valuation of the district on the tax rolls of 1906 and 1907 was $9,630,566. and $10,097,784., respectively.

The amount and cost of the levee work done in the district during the past two years, by the district, the State and the United States, is approximately as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District.....	5.54	7.57	1,254,963	$256,389.59
By the State	2.49	13.93	828,797	149,957.45
By the United States.....	4.11	0.78	1,110,619	338,410.02
Totals	12.14	22.28	3,194,379	$744,757.06

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is approximately as follows:

By the District.....	73,000 Cubic Yards	Costing	$ 19,200.00
By the State	432,708 Cubic Yards	Costing	106,092.50
Totals	505,708 Cubic Yards	Costing	$125,292.50

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, protection and preservation of its line of levee generally, including drainage of batures, etc., $10,446.77, and for protection work during high water $8,840.45, while the United States assumed the construction of bank protection work in the district, involving further large expenditures.

During the past two years, the Fifth Louisiana Levee District, experienced high water only in 1907. During this water, the stage reached at Greenville was 47.30 feet; at Lake Providence 46.30 feet; at Vicksburg 49.70 feet; and at St. Joseph 46.20 feet.

The high water of 1907 along the upper part of the district, that is, from the Arkansas line to Henderson, necessitated the inauguration and prosecution of considerable protection work. Sacks were purchased by the district, and the Steamers Chiska and Colum-

bia were, for purposes of transportation and patrolling, placed at the disposal of the District by the United States Government. The remarkably early period—January and February—at which this flood occurred was without precedent in the annals of the river, and many works which would have been placed under contract a month or two later, remained still unlet; hence it was that it became necessary for the Fifth Louisiana Levee District and the Board of State Engineers to place under contract the construction of emergency loops at the following points, to-wit: Salem, in East Carroll; Bedford, in Madison; Palmyra No. 1, in Tensas; and Sycamore and Green in Concordia, at all of which places, due to caving, there was danger of breaches in the main line of levee. Forces were immediately placed on these emergency loops, and substantial run-arounds promptly completed. All of these levees are extremely important, and a break in any one of them would have resulted in the inundation of a large and valuable section of country.

It has been stated by engineers of experience and ability that between Greenville, Miss., and the mouth of Red River, a greater amount of caving occurs than in any other stretch of the river. That part of the Mississippi River North of Vicksburg is known to steamboat men as "The Bends," which is self-explanatory. The caving banks along the Fifth Louisiana Levee District make it a source of constant apprehension as to what will go next, and in the past it has been a question of not what would be ultimately necessary, but how soon would the next long line of levee be required. It is generally recognized that the greatest amount of caving occurs at the upper end of bends at low water, and at the lower end in high water. The rate of caving in years has hardly ever been less than 400 feet a year—not 400 feet in length of shore line, but 400 feet of recession from the river bank. Among those points which have given the greatest amount of trouble in the past, due to caving banks, are: Elton, Salem, Henderson to Cabin Teele, Duckport, Reid, Diamond Island, Killie Krankie, Point Pleasant, Hard Times, Bondurant, St. Joseph to Harper Bayou, L'argent, Marengo, White Hall, Green, Forest Home, Glasscock, Bougere and Point Breeze. All of these points have been constant sources of anxiety to and attention by the levee authorities during the past four years, and will continue to be so for all time to come, unless a radical change in the channel occurs to improve conditions.

Revetments for bank protection have so far been constructed by the Government along the front of the Fifth Louisiana Levee District, as follows: Elton or Providence Reach, Delta Point, Reid, Bondurant, Kempe, and Giles Bond, all of which have been maintained and extended by the Government under annual allotments by the Mississippi River Commission. The most acute situation to-day exists at Reid Bend, where no work by the United States Government has been possible during the past two years, owing to scarcity of plant. So only a very small amount of revetment has so far been placed in position there, and none at all during the past year. This is much to be regretted, as this bend, at the present time, presents the most acute situation of any bend along the front of the Fifth Louisiana Levee District, and the danger of the current of the river flanking the revetment, or in other words going shorewards and leaving the revetment in the middle of the river, is imminent. No criticism of the National Government is intended by these remarks, as the delay is well known to be due to the fact that other important works forcibly occupied the attention of the Government Engineers and their assistants, above Reid, rendering it impracticable to reach Reid Bend during the past year.

The general condition of the line of levee protecting the Fifth Louisiana Levee District has been materially improved during the past two years. The levees generally are free from weeds and well sodded, yet the roaming of hogs at large, owing to sparse settlement and large wooded areas, here and there, along the levee line has not yet been satisfactorily corrected, and the inspectors, in spite of all the energy exhibited, have been unable to much abate this nuisance. Many stock paths are worn in the line, in stretches, but, taking it as a whole, the general condition of the line of levee is as good as maintains in any other levee district.

In the reports of the Board of State Engineers for the past several years, numerous references have been made to the Bougere Levee. It was agreed, among other things, within the past four years, that, in consideration of the United States Government undertaking the construction of a line of seven miles of levee, averaging 20 feet in height, and involving an expenditure aggregating about $480,000, necessary to close the Bougere Gap, the State and District would care for all that line of existing levee in the district extending from opposite Warrenton, Miss., to the mouth of Red River. Both of these agreements have been carried out,

the State and the District have built all new levees and done all repair work necessary between the points named, and the United States Government has let and constructed all but 2.0 miles of the levee required to close Bougere Gap. Had the proposition to rectify and enlarge the existing levee line from Fairview to Bougere and to construct the necessary line to close Bougere alone, been presented to any one of these authorities, it would have been thought to be beyond the resources of either. There remains, at this time, only about 400,000 cubic yards of earthwork to be placed in position to complete the Bougere Levee. When this will have been done, the continuous levee line in the Fifth Louisiana Levee District will have been extended more than thirty miles, and protection to the valuable country lying behind it and Black River, in Catahoula, Concordia, and Tensas Parishes, greatly advanced.

During a recent tour of inspection down the Ouachita River by a member of the Board of State Engineers, extending from Monroe to the mouth of the Ouachita, it was found that though the lands lying along the Mississippi River were practically already overflowed by the stage of water then prevailing, a margin of bank ranging from 3 to 10 feet was still being enjoyed by the riparian owners on Black River, and their back lands were still free from overflow. A close investigation by the citizens of that section of the State resulted in a concensus of opinion that the closure of Bougere Crevasse, has resulted in lowering the flood level of Black River, due West from Bougere, some 5 feet.

The closure of Bougere Crevasse this year, was brought about by the temporary connection of the United States levee with the railroad embankment of the Texas and Pacific Railway Company, constructed by that Company across its 4,000-foot trestle in Bourgere Swamp. This embankment has a crown about 15 feet wide, and slopes of about 3 and 3 to 1, and is so far holding out the flood waters of the Mississippi River of this year, at the present date at a more than bankful stage.

The citizens of Iberville, Pointe Coupee, St. Martin, St. Mary, Iberia, St. Landry, Avoyelles, Catahoula, Concordia, and Tensas Parishes, are looking forward with interest to the time when Bougere will be finally closed, the lock at Bavou Plaquemine opened and operated, and the Red and Atchafalaya Rivers divorced from the Mississippi River. Many other Parishes even will be directly or indirectly favorably affected by this closure, and a

majority of those interested in running steamboats in the Red, Ouachita and Little Rivers, out of either the Port of New Orleans or Natchez, look with favor upon the time when the flood waters of the Mississippi River shall be thus excluded from backing up these tributaries or going down the Atchafalaya River. The value to the State of Louisiana of such a consummation would be inestimable. Plantations that are now deserted and grown up with timber, would be opened up again, and land values would rise and industries spring up,. which even the river men appreciate would be of more value to them than the mere fact of navigating from Old River to Barbres Landing.

3. *The Atchafalaya Basin Levee District*: Composed of the Parishes of Pointe Coupee, West Baton Rouge and Terrebonne, and parts of the Parishes of Iberville, Ascension, Assumption, Lafourche, St. Martin, St. Mary and Iberia.

The District coincides with the United States "Atchafalaya District."

The affairs of the district are conducted by a Board of Commissioners consisting of seven members, three of whom are appointed from the Mississippi River Parishes, three from the interior Parishes, and one at large, on the recommendation of the railroads of the district.

The domicile of the district is at Port Allen, West Baton Rouge Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the district, and possessions thereon.

Forced Contributions: Two and a half cents per acre on all land within the district; $60.00 per mile of railroad line; 25 cents per 1,000 lbs. of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 4 cents per ton of cane when same is removed from the limits of the district, and beyond the limits of any levee district in the State; 25 cents per bale of cotton; 2 cents per 100 lbs. of seed cotton, when same is removed from the limits of the district, and beyond the limits of any other levee district of the State; 1¼ cents per sack of rough rice.

The authorized bonded debt of the district is $1,000,000., of which $850,000 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $22,102,378. and $22.785,160., respectively.

The amount and cost of the levee work done in the district during the past two years, by the district, the State and the United States, is approximately as follows, viz:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
ON THE MISSISSIPPI RIVER.				
By the District	2.15	8.02	1,270,967	$287,410.87
By the State	0.24	2.40	297,851	87,685.00
By the United States	2.47		479,146	85,498.81
Totals	4.86	10.42	2,047,964	460,594.68
ON THE ATCHAFALAYA RIVER.				
By the District	....	4.83	179,383	$34,072.87
RECAPITULATION THROUGHOUT THE DISTRICT.				
By the District	2.15	12.85	1,450,350	$321,483.74
By the State	0.24	2.40	297,852	87,685.00
By the United States	2.47	....	479,146	85,498.81
Totals	4.86	15.25	2,227,347	$494,667.55

The amount and cost of the levee work still remaining, at this time under existing contracts, to be done in the district, by the district and the State is as follows:

By the District	2,044,659 Cubic Yards	amounting to	$425,614.34
By the State	149,149 Cubic Yards	amounting to	35,050.00
Totals	2,193,808 Cubic Yards	amounting to	$460,664.34

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its lines of levee, generally, $8,172.12, and for protection work during high water, $441.00.

During the past two years the bulk of the work in the Atchafalaya Basin Levee District has been done on the Mississippi River, although some enlargement of the existing levees has been carried on the Atchafalaya River. No extension of the levee line on the Atchafalaya River has been built since 1903, when the levee line was completed down to Sherman Bayou.

The caving on the Mississippi River front of the Atchafalaya Basin Levee District has been somewhat severe, especially during the past year, owing to the protracted high stage of water in the Spring of 1907.

The construction of new levees in the district generally is a work of such magnitude, owing to the size of the levees and their sections, that it is necessary to anticipate an actual breach in the levee line, and to begin building new levees before breaches occur, and when the caving is only threatening; in that way alone can the district be certain of building the new levees before the system is actually breached, and thereby maintain the continuity of its levee line.

The enlargement of the levees has been systematically carried on, and has consisted of adding largely to the section of the levee, although in some instances it has been necessary to add to their height, where they were too low. The Levee Board is now enlarging its levees to a section which, in its opinion and that of the Engineers, will make it final as far as section is concerned. It is estimated that with the present revenues of the Board and the assistance which it receives from the State and the Federal Government, in five or six years more it will have enlarged its Mississippi River levees to such a section as may be considered final.

The question of grade or height of the levee is as yet not finally settled. Although the Mississippi River Commission has established a grade for the levees on the Mississippi River, which is adopted by the districts for the present, yet, within the past year or two, the Commission has found it necessary to revise this grade, and it is quite possible that developments of the future may, owing to the deforestation, improved drainage in the tributary basins, and other causes, render a further revision of the grades necessary.

Within the last year, a demand has been made by the residents on both sides of the Atchafalaya River for a prolongation of the levee system in order to protect their lands. On the East bank of the Atchafalaya River this prolongation can easily and effectively be carried on by extending the levees from Bayou Sherman, where

they now terminate, as far as topographical conditions will permit. This extension has been determined upon.

On the West bank of the Atchafalaya River, the residents of St. Martin, Iberia and St. Mary have made a similar request.

At this juncture it might be interesting to state that, prior to the organization of the Atchafalaya Basin Levee District, when the levees of Pointe Coupee Parish, especially Morganza, were frequently breached, the volume pouring through the crevasses, across the country, and raising the floods of the Atchafalaya River, flooded the Teche lands to unusual extent. The making secure of these Pointe Coupee levees by the district has removed from the Teche lands this cause of overflow.

The extension of the levees, however, on the East bank of the Atchafalaya, in the Atchafalaya Basin Levee District, and on the West bank of the Atchafalaya River, in the Red River, Atchafalaya and Bayou Boeuf Levee District, has to some extent raised the flood level of the Atchafalaya River, at and below the lower termini of the present levee lines, tending somewhat to occasion higher stages of flood waters in St. Martin, Iberia and St. Mary.

An examination of the locality, however, reveals the fact that the present flood stage is by no means as high as the flood stage existing on those lands prior to the organization of the Atchafalaya Basin Levee District, when the Pointe Coupee levees, above referred to, were frequently breached.

Topographical reasons which are recited at length in a report made to the Atchafalaya Basin Levee District on January 11, 1908, and published in Appendix "B" of this report, show that it is impossible for the Atchafalaya Basin Levee District to give protection to the West bank of the Atchafalaya River, unless legislation is passed, extending the jurisdiction of the Atchafalaya Basin Levee District, and allowing it to co-operate with the levee building of the Levee Districts situated North of it, viz: the Courtableau Levee District, and the Red River, Atchafalaya and Bayou Levee District.

The hands of the Board of Commissioners of the Atchafalaya Basin Levee District, in the matter of giving protection to the West bank of the Atchafalaya River, are tied until the legislation required is passed.

The authorities of the Levee District, however, have expressed their desire and willingness to undertake the necessary work as

soon as laws have been enacted permitting considerations and policies governed by the natural topography of the country.

Certain work has been carried on in Bayou Lafourche in accordance with the laws governing the same, the character of which is treated under the heading "Bayou Lafourche."

4. *Cat Island Levee District*: Situated in the Parish of West Feliciana. It comprises the territory on the East bank of the Mississippi River from Ratcliffe's Landing to Bayou Sara. It was created by Act 110 of 1894, which provided for the appointment of five Levee Commissioners, and authorized the issuance of bonds to the amount of $100,000.

As stated in previous reports, surveys have shown that the cost of the levees necessary for the protection of this district would be excessive as compared with the probable revenues, and that, even after building an effective levee system, the drainage of the district during prolonged seasons of high water could only be maintained by the operation of costly pumping machinery. Under these circumstances, no action has ever been taken by the Commissioners for raising funds or for undertaking levee work.

5. *Pontchartrain Levee District*: Composed of the alluvial lands on the East bank of the Mississippi River, between the Cities of Baton Rouge and New Orleans, consisting of parts of the Parishes of East Baton Rouge, Iberville, Ascension, St. James, St. John, St. Charles and Jefferson. Its situation is so favorable as to make it dependent for protection solely upon the integrity of its levee line on the Mississippi River front of the district, and upon its "Upper protection levee," extending from the main line of levee, on the Mississippi River, back to the highlands.

The District is included in the United States "Pontchartrain District."

The affairs of the district are conducted by a Board of Commissioners consisting of nine members, one from each Parish in the district, and one representative, respectively, of the Illinois Central Railroad Company, and of the Louisville, New Orleans and Texas Railway Company.

The domicile of the district is at Convent, St. James Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the district, and possessions thereon.

Forced Contributions: Three cents per acre on all land other

than that cultivated in sugar, cotton or rice (except swamp land subject to tidal overflow); 15 cents per barrel of sugar; 50 cents per hogshead of sugar; 5 cents per barrel of molasses; 3 cents per sack of rough rice; 50 cents per bale of cotton; 7½ cents per ton of sugar cane, grown in the district and removed therefrom before being converted into sugar; 4 cents per 100 lbs. of seed cotton, grown in the district and removed therefrom; $100.00 per mile of main line of railroad.

The authorized bonded debt of the district is $1,000,000., of which $730,000. is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $9,416,741. and $10,483,771., respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district, the State and the United States, was approximately as follows, viz:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	0.71	3.68	246,505	$ 55,383.40
By the State	0.96	1.47	193,041	34,282.82
By the United States	1.30	11.93	765,902	113,514.80
Totals	2.97	17.08	1,205,448	$203,181.02

The amount and cost of the levee work still remaining at this time, under existing contracts, to be done in the district, is as follows:

By the District	1,300	Cubic Yards amounting to	$ 390.00
By the State	144,600	Cubic Yards amounting to	26,854.75
Totals	145,900	Cubic Yards amounting to	$27,244.75

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its lines of levee generally, $46,055.28.

The condition of the line of levee in this district, the length of which is 125.9 miles, including the "Upper Protection Levee,"

0.27 miles long, has been very much improved in grade and section since the last biennial report of the Board of State Engineers, and when the contracts at present outstanding in the district are completed, 91 per cent of the line will be up to Mississippi River Commission Grade, with only 8 miles of levee as low as from 2 to 3 feet, and 8 miles from 3 to 4 feet, above the highest water.

The construction of new levees on account of future caving of river banks, and the enlargement of the remaining line of existing levee to Mississippi River Commission Grade and section will continue, as in the past, to demand the closest attention on the part of the District, and strain its utmost resources. The maintenance, supervision and care of its line of levees should in the meantime demand equal attention and consideration, and regulations bearing on this subject should, from this time on, be enforced by the authorities.

Some effort in this direction has been accomplished in the past two years, and considerable work in weed cutting, drainage of borrow pits, restoring of wave wash, etc., has been done under contracts by the district. It is absolutely necessary, in order to have access to the levees at all times in this district, that the public highway should be located parallel to and along the land base of its levees. There are six stretches of levees in this district, namely: Below Plaquemine Point, in Iberville Parish; below College Point, in St. James Parish; in front of the Montegut and Ory Plantations, in St. John Parish; in front of Almedia Plantation, in St. Charles Parish; and in the Town of Kenner, Jefferson Parish, where the public highway, much to the detriment of both road and levee, does not skirt the levee.

The construction and maintenance of the public highways devolve in law upon the Police Juries of the repective parishes in which they occur. However, in very few of the parishes in the district do the roads receive anything like the attention necesary to their proper maintenance. In consequence, the levee line is, in a number of localities, very much injured, especially during the high water season, by the encroachment of vehicles upon the slope of the levee.

6. *The Lafourche Basin Levee District*: Composed of all the alluvial lands, except the Parish of Orleans, lying between Bayou Lafourche, the Mississippi River, and the Gulf of Mexico, in those parts of the Parishes of Ascension, St. James, St. John, St. Charles, Jefferson and Plaquemines, lying on the right or west bank of the Mississippi River, from Donaldsonville to the lower line of Riceland Plantation, and of the Parishes of Ascension, Assumption and

Lafourche, lying on the left bank of Bayou Lafourche, from Donaldsonville to "Chere Ami Canal."

The district is included in the United States "Lafourche District," and part of the United States "Barataria District."

The affairs of the district are conducted by a Board of Commissioners composed of nine members, one from each Parish, or part of Parish in the district, and one in the district at large, appointed on the recommendation of the railroads of said district.

The domicile of the district is at Gretna, Jefferson Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Two and one-half cents per acre on all land; $100.00 per mile on all standard gauge lines of railroad, operated by steam, excepting railroads the total length of which, in the State, is less than 100 miles, upon which the rate shall be $50 per mile; 10 cents per barrel of sugar; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $13,890,104. and $14,791,333., respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district, the State and the United States, is approximately as follows, viz:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	3.85	6.87	571,503	$140,582.73
By the State	1.42	1.02	238,216	47,171.18
By the United States	0.71	11.22	350,148	53,921.69
Totals	5.98	19.11	1,159,867	$241,675.60

The amount and cost of the levee work still remaining at this time, under existing contracts, to be done in the district, is approximately as follows, viz.:

By the District	250,675	Cubic Yards amounting to	$73,273.95
By the State	113,181	Cubic Yards amounting to	25,997.86
Totals	363,856	Cubic Yards amounting to	$99,271.81

In addition to the above, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its line of levee generally $68,674.47, and in protection work during high water $41,411.63.

The levee line throughout this district, on the Mississippi River, the length of which is 119.6 miles, has been very much improved in grade and section since the last biennial report of the Board of State Engineers. When the contracts at present outstanding in this district are completed, 91 per cent of the line above the city of New Orleans will be up to Mississippi River Commission Grade. In the Parish of Plaquemines, below the City of New Orleans, however, where the high water of 1903, along the upper portion of the parish, stood eight-tenths of a foot, and at Riceland, at the lower end of the district over one foot higher than the highest previous water (1907), the Board of State Engineers, for all State and district work in the future in this parish, recommended a grade of 3 feet above the high water of 1903. This line of levee, some 37.9 miles in length, has been considerably improved in the last two years in grade and section and when all outstanding contracts are completed, 57 per cent. of it will be up to the grade designed.

In the early part of December, 1906, the water in the river covered the low battures, and was above the natural surface of the lands adjacent, and well against the levees in Plaquemines Parish. Notwithstanding the fact that all necessary vigilance and preventive measures were taken by those in authority to avert disaster in this parish, the levee on the front of the Live Oak Grove Plantation, between the hours of 9 and 10 P.M., on Thursday, February 21, 1907, was breached, when the river stood at its highest stage for that year, 19.8 on the Canal Street gauge at New Orleans.

The crevasse, however, was closed on March 23, 1907, at a total cost to the district of $39,836.66, and a serious disaster to the district thereby averted. The damage done, while the crevasse ran, was extremely local. In a report dated June 4, 1907, to the Board of Commissioners of the Lafourche Basin Levee District (vide Appen-

dix "B") a detailed description of the location, treatment, etc., of the crevasse will be found.

The line of levee in the district on the "Lower Coast" continues to be subjected to a greater strain than was the case in the past, due to the earlier occurrence and longer duration of high water, to prevailing winds and storms, and to the wash of waves from the plying of large ocean steamers, yearly increasing in size, speed and number, as explained in the last biennial report of the Board of State Engineers. Such levees, therefore, have to be protected by wooden revetments, on which character of work the district has in the past two years, expended some $31,669.76.

The cleaning of the levees of weeds, the drainage of the borrow pits, and the restoring of wave wash has also, in some of the parishes of the district, been fairly well done.

7. *The Orleans Levee District*: Composed of the Parish of Orleans.

The public levee lines of the district lie on both sides of the Mississippi River—that on the left or east bank being 12.62 miles, and that on the right or west bank 13.82 miles in length.

The district also maintains lines of "Rear Protection Levee," aggregating about 48 miles in length.

The affairs of the district are conducted by a Board of Commissioners, composed of nine members, seven being appointed by the Governor of the State, and two, the Mayor and Commissioner of Public Works of the City of New Orleans, being ex-officio members of the Board.

The domicile of the Board is at New Orleans, La.

The only district tax authorized and permitted by law in the district is an annual ad valorem tax of one mill on the dollar on all property subject to taxation in the district.

The authorized bonded debt of the district is $500,000. Of this $269,000 is at this time outstanding.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $208,740,300. and $222,174,770., respectively.

From the tabulated statement in Appendix "A," kindly furnished by request by the Board of Commissioners of the Orleans Levee District, it will be seen that expenditures for levee purposes have, during the past two years, been made by the district, as follows:

Earthwork: 8,707 linear feet of new levee, and 21,384.5 linear feet of enlargement, containing 273,742.6 cubic yards, and costing $147,228.51.

Revetment: 7,220 linear feet of revetment, amountinng to 415,519 feet board measure, and costing $22,204.28.

General maintenance and repair of levees, etc., $74,905.29.

Total expenditure as above, $244,338.08.

In addition to the foregoing, certain contracts for back filling, pile bank protection, etc., reported in the last biennial report of the Board of State Engineers, as not then finished, have since been completed. The cost of these aggregated $27,832.13.

In addition to the statement of expenditures furnished, the Board of State Engineers is further indebted to the Board of Commissioners of the Orleans Levee District for the following general outline of operations contemplated during the coming season.

"In addition to the work mentioned in the statement, some of which is now under contract, it is the intention of the Board to complete, during the coming season, the entire stretch of levee in the Third District, from Louisa Street to Poland Street, about 4,000 feet in length, at an approximate cost of about $120,000.00, a part of which will be used for the purchase of property necessary.

"All other work approved by the General Levee Conference is as follows:

"From Louisiana Avenue to Seventh Street.

"From First to Jackson Avenue.

"From Protection Levee to Fern Street.

"Will no doubt be advertised for as soon as the river stage will permit.

"This work will cost about $500,000 including amount to be paid for property.

"In the Fifth District, there will be spent to complete work now under contract and that proposed about $75,000.00.

"We estimate that it will require about $125,000.00 to complete the two contracts in the Third and Fourth Districts now partially built, making a total of $820,000.00 which we consider will be needed to carry on the improvements when the season is favorable."

As shown by the foregoing statements, from the Orleans Levee District, very material improvement has been made upon the levee lines of the district within the past two years. However, notwithstanding this fact, a very great deal remains yet to be done to bring these levee lines up to anything like the standard demanded by the conditions affecting them and the interests involved.

An inspection by the Board of State Engineers during the high

water of 1907 of the lines of public levees in the Orleans Levee District, along the Mississippi River, showed the following:

Of the 12.62 miles of levee on the left, or east bank, 3 per cent. of the line was from 3.5 to 4 feet above the highest water of record (1903); 38 per cent. from 3.0 to 3.5; 17 per cent. from 2.5 to 3.0; 5 per cent. from 2.0 to 2.5; 12 per cent. from 1.5 to 2.0; 4 per cent. from 1.0 to 1.5; 4 per cent. from 0.5 to 1.0; 7 per cent. from nothing to 0.5; while 3 per cent. was from nothing to 0.5 feet below the high water of 1903; 7 per cent. from 0.5 to 1.0; 1 per cent. from 1.0 to 1.5; and 1 per cent. from 1.5 to 2.0 below the high water of 1903.

Of the 13.88 miles on the right or west bank, with the exception of a number of noticeable short stretches along its commercial front, standing but little, if at all, above high water, the line of levee in the Orleans Levee District, averaged generally from 2.0 to 3.0 feet above high water of 1903; 7 per cent. from 0.5 to 1.0; 1 per cent from 1.0 to 1.5; 1 per cent. from 1.5 to 2.0 below the high water of 1903.

As a consequence of these low grades, and other defects, of a more or less serious character, here and there, the Orleans Levee District, during the past year, in response to public demand, finally inaugurated a movement to improve and maintain, as rapidly as possible, its line of levees along the Mississippi River to standard grades and sections.

To this end, the Board of State Engineers, by request, submitted a project for the consideration of the Board of Commissioners of the Orleans Levee District, and others interested in the welfare of the district, the general provisions of which have been adopted, as the basis of future levee improvement in the district.

Impressed with the view that materially increased flood elevations might in the future be expected on the Lower River, together with a knowledge of the extreme wear and tear to which embankments along its river front must be subjected in the operations of shipping and commerce, the necessity for the construction and maintenance of embankments of a superior order presented itself to the Board of State Engineers, resulting in the recommendation of a general formula to govern in the construction of levee lines in the district. Easy slopes to facilitate approach to the wharves and sheds for shipping had also, of course, to be taken into consideration.

In general terms, this formula proposed an embankment of earth to be built and maintained to a grade not less than five (5) feet above the high water of 1903, with a crown not less than 50 feet wide, river side slope not steeper than three horizontal to one vertical, and land side slope not steeper than ten horizontal to one vertical, the

flattening of slopes and widening of crown beyond these limits to be governed by the special needs of localities.

Such an advanced proposition was believed to be warranted by the magnitude of the interests involved in the district, and the belief that the line of protection of the district against overflow from the Mississippi River should be placed upon the most unassailable plane that could be designed and practically and comprehensively carried out by the district.

In view of the great betterment proposed and being gradually carried on by the other levee districts throughout the State, any grade and section less than that recommended was not, in the opinion of the Board of State Engineers, believed to be materially superior to the other improved lines of levee in the State.

The final cost of such a project cannot well be estimated, at this time, but, including payment for property appropriated, so far averaging, as shown by the work undertaken since the inception of the project, not less than three times as much as the cost of the levee work itself, must reach into many millions of dollars.

Therefore, the question of appropriation of property required to carry out the levee improvements proposed in the Orleans Levee District will, from the standpoint of practicability in cost, at all events, necessitate the location of the proposed levee improvements as close to the edge of the banks of the river as possible, and conditions justify.

Along the greater part of the lines of levee in the district, the banks of the river are sufficiently stable, and give promise of future stability, to warrant this. But, along many other stretches they are far from stable, and, under such circumstances, to proceed with a project for levee improvements on such an advanced scale, as that proposed, except in conjunction with comprehensive works of bank protection is, to say the least, extremely questionable.

The project, therefore, must include establishing, as nearly as possible, throughout the harbor at least, fixed lines, to which to build.

It must, however, be recognized that this character of work, under any circumstances, is manifestly beyond the resources and scope of the Orleans Levee District. When considered in conjunction with the extent of levee improvement proposed, it is prohibitive.

However, so insistent and so justified was the demand for the improvement of the river front on the lines set forth, that the Orleans Levee District proceeded, in advance of any direct prospect or preparation of securing bank protection, to carry out the project, hoping that the national government might be induced to come to its rescue

in that respect, before any very great loss from the movement of the bank could occur to such levee work as it might in the meantime hope to execute.

Thus a number of localities in the district have already been selected for treatment, under locations, plans and specifications approved by the Board of State Engineers, at most of which work has already been undertaken.

In approving these locations, the Board of State Engineers wishes to say that it has, in each instance, been influenced by the hope entertained by the Orleans Levee District, shared in by itself, that bank protection, where needed, would follow. In fact, unless this promptly be the case, the locations so far approved by the Board of State Engineers are, in several instances, in no way justified. This is especially true in regard to locations in the Third District of the City of New Orleans, where, without bank protection, the levee improvements contemplated are doomed to failure.

Thus, strong argument has been advanced by the Orleans Levee District, the State, and others interested in the district, to impress upon the national government the necessity, urgency and justice of assisting the Orleans Levee District in this gigantic work which it has on hand, by at least providing the means for and directing the construction of the bank protection needed to make its work of protection against overflow throughout its jurisdiction an unqualified success.

Since the inauguration of this new project by the Orleans Levee District to improve its lines of levees to standard grades and sections, as described in the foregoing, the national government, in partial recognition of and response to representations on this line recently made to it, has promptly expended some $30,000.00 in bank protection work in the Third District, and the outlook for further early aid in this direction from the national government is, at this time, very promising.

As already often declared, it is a well known fact that the Orleans Levee District is of record as announcing that if the national government will only undertake the task of bank protection within its limits the district will construct and maintain all the levee lines demanded.

To do this—construct and maintain the levee lines demanded—large outlays of money must be made, larger by far than any resources now possible for the district to raise under existing legislative enactments.

It is, therefore, understood that the district will appeal to the General Assembly of the State at its approaching session this year for authority to issue bonds to an amount sufficient to enable the district to finance its levee project.

The Board of State Engineers earnestly hopes that the appeal of the Orleans Levee District will receive the careful consideration and approval of the General Assembly.

8. *The Lake Borgne Basin Levee District*: Composed of the alluvial lands on the east bank of the Mississippi River below the City of New Orleans, situated in the Parish of St. Bernard, and in that part of Plaquemines Parish lying north of the lower line of Bohemia Plantation.

The district is included in the United States "Lake Borgne District."

The affairs of the district are conducted by a Board of Commissioners consisting of three members, one from each parish in the district, and one representative of the New Orleans and Southern Railway Company.

The domicile of the district is at New Orleans, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents on each and every acre of land within the limits of the district susceptible of cultivation; $60.00 per mile of railroad line; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 10 cents per barrel of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges produced in said district; 1½ cents per barrel of oysters gathered from the waters within the limits of the district.

The authorized bonded debt of the district, all of which is outstanding, is $100,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $2,456,797 and $2,771,120. respectively.

The amount and cost of the levee work done in the district, during the past two years, by the State and the United States, was as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the State	0.71	2.41	103,818	$24,358.14
By the United States	0.55	4.46	142,136	29,288.73
Totals	1.26	6.87	245,954	$53,646.87

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the State, 21,159 cubic yards, amounting to $4,989.63.

In addition to the foregoing, the district has expended in minor repairs, and for the care, protection and preservation of its line of levees $20,921.37, and in protection work during high water, $1,677.58.

The levee line in this district, the length of which is 48.3 miles, has been very much improved in grade and section since the last biennial report of the Board of State Engineers, and when the contracts at present outstanding in the district are completed, 32 per cent. of the levee line will, in accordance with the recommendations of the Board of State Engineers, be up to a grade 3 feet above the highest water of record, namely, that of 1903.

The levee line in this district is also subjected to a greater strain from floods, occurring latterly at a much earlier period and being of longer duration than was formerly the case. Owing also to prevailing winds and storms, as well as the wash of waves from the plying of large ocean steamers, yearly increasing in size, speed and number, the levees of the district must be protected by wooden revetments, imposing considerable additional cost to the district. The district has, in the last two years, spent over $1,735. for this character of work.

The cleaning of the levees of weeds, the drainage of barrow pits, and the restoring of wave wash has, under authority of the district, been well done by the inspectors.

9. *The Grand Prairie Levee District*: Composed of the alluvial lands subject to overflow on the left or east bank of the Mississippi

River, embraced within the Parish of Plaquemines, from the lower line of Bohemia Plantation to the lower line of Baptiste Collette Gap.

The district is included in the United States "Lake Borgne District."

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Pointe a la Hache, Plaquemines Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: One dollar on every arpent front of land within the district facing the Mississippi River; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of esculents; 5 cents per barrel of oranges, produced within the limits of the district, and 3 cents per barrel of oysters gathered from the waters of the district.

The authorized bonded debt of the district, all of which is outstanding, is $30,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $198,310 and $208,640, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the State and the United States, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	1.43	2.00	79,672	$23,304.14
By the United States	....	1.60	26,933	12,614.64
Totals	1.43	3.60	106,605	$35,918.78

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the District	3,948	Cubic Yards amounting to	$ 1,500.00
By the State	33,700	Cubic Yards amounting to	13,448.34
Totals	37,648	Cubic Yards amounting to	$14,948.34

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, protection and preservation of its line of levees, $2,824.39, and in protection work, during high water, $1,036.21.

The line of levee in this district, the length of which is 30.6 miles, has been very much improved in grade and section since the last biennial report of the Board of State Engineers. Yet there remains considerable work to be done to bring it up to a grade 3 feet above the highest water of record, namely that of 1903, at the upper end of the district, and that of 1907, at the lower end of the district, which grade has been recommended by the Board of State Engineers.

In the lower end of this district, from above Old Quarantine Station to New Canal, a distance of about 9½ miles, some fifteen or more gaps in the levee line were caused by the levees being breached from the land side by waves from the gulf during the equinoctial storm of September 26 and 27, 1906. The early rise of the river in December, 1906, found the closure of many of these gaps not sufficiently advanced to withstand the water in the river, and in the early part of January the water ran through them. The damage resulting therefrom was extremely local, and not sufficient to justify the expense attached to the closure of these breaks during high water. See report of April 9, 1907, to the Board of Commissioners of the Grand Prairie Levee District, published in Appendix "B," for details.

The levees in this district, like all those in the districts on the "Lower Coast," are also subjected to a greater strain from floods, occurring latterly at a much earlier date and lasting for a longer period of time than was formerly the case. Owing also to prevailing winds and storms, as well as the wash of waves from the plying of large ocean steamers, which are yearly increasing in size, speed and number, they have to be protected by wooden revetments, involving considerable additional cost to the State and district. Some $8,821.11 has been spent in the district in the last two years in this character of work, the larger part of which was contributed by the State.

The present line of levee should be extended to the lower limits of the district as soon as the necessary funds are available, closing Bayou

Baptiste Collette Gap, a small outlet of the Mississippi River, which, during flood, carries considerable sediment, deleteriously affecting the oyster bedding grounds in the rear, from which industry considerable revenue is derived by the district.

The cleaning of the levees of weeds, the drainage of borrow pits, and the restoring of wave wash has been fairly well observed during the last two years.

10. *The Buras Levee District:* Composed of the alluvial lands subject to overflow on the right or west bank of the Mississippi River, "in the Parish of Plaquemines, south of a line drawn from the lower line of Riceland Plantation to the limits of Harang Canal on Bayou Lafourche," extending to the Jump.

The district is included in the United States "Barataria District."

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the Board is at Buras, Parish of Plaquemines, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents per acre on land susceptible of cultivation within the limits of the district; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 5 cents per ton of cane; 5 cents per sack of rough rice; 2½ cents per barrel of oysters; 2½ cents per bushel of esculents; and 5 cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $35,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $500,050 and $621,798, respectively.

The amount and cost of the levee work done in the district during the past two years, was as follows, viz:

WORK DONE:	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST.
By the State	[illegible]	[illegible]	$2,[illegible]2	$26,389.52

The amount and cost of levee work still remaining, at this time, to be done in the district, under existing contracts, is as follows:

By the State, 6,012 cubic yards, amount to $1,162.31.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, protection and preservation of its line of levee $14,725.82 and in protection work during high water $3,384.40.

The line of levee in this district, the length of which is 33.8 miles, has been very much improved in grade and section since the last biennial report of the Board of State Engineers, yet there remains considerable work to do to bring it up to the grade recommended by the Board of State Engineers, namely, 3 feet above the highest water of record along this part of the river—that of 1903 at the upper end of the district, and 1907 at the lower end of the district.

The line of levee in this district is also subjected to a greater strain from floods, occurring latterly at a much earlier period, and extending over a greater length of time than was formerly the case. Owing to prevailing winds and storms, as well as the wash of waves from the plying of large ocean steamers, yearly increasing in size, speed and number, the levees of this district have to be protected by wooden revetments, entailing considerable additional cost upon the district, $14,763.94 having been spent in this character of work in the district during the past two years, about equally contributed by the district and the State.

The cleaning of the levees of weeds, the drainage of borrow pits, and the restoring of wave wash in this district has been well done.

11. *The Plaquemines Parish East Bank Levee District*: Consists of all the territory contained within the Parish of Plaquemines on the left or east bank of the Mississippi River, beginning at the upper line of Harlem Plantation and extending to the upper bank of Cuselich Canal, on the property of Peter Cuselich, below the Old Quarantine Station. It is entirely included within the limits of the Lake Borgne Basin Levee District and the Grand Prairie Levee District, so that all parts of it are also parts of another levee district. In this respect, as well as having been constituted, "for the purpose of protecting the lands of said district from inundation from the waters of the Gulf of Mexico," the Plaquemines Parish East Bank Levee District differs from any of the levee districts of the State previously created.

The affairs of the district are conducted by a Board of Commissioners consisting of five members.

The domicile of the district is at Pointe a la Hache, Parish of Plaquemines, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of "10 mills on the dollar of the assessed valuation" of the district. Should this tax prove inadequate, the district is further permitted "to levy annually a district tax not to exceed 50 mills on the dollar, on its assessed valuation," provided, "that the said Board of Commissioners shall, in accordance with Article 239 of the Constitution of 1898, first submit, without any previous petition, the purpose for the proposed increased levy, and the length of time the same shall be levied, to a vote of the property tax payers of said district," etc.

Forced Contributions: One dollar per acre on all lands in the district protected from inundation, lying between the Mississippi River and the Gulf Coast levees; $30 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of vegetables and fruits other than oranges; 5 cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $135,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $249,390. and $249,100. respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district and the State, was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST.
	New Levee Built	Levee Raised and Enlarged		
By the State	1.25	.....	32,497	6,895.25
By the District	5.94	13.78	423,395	$51,387.49
Totals	7.19	13.78	455,892	$58,282.74

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done in the district, is approximately as follows:

By the district, 567,643 cubic yards, amounting to $67,205.70.

In addition to the foregoing, the district, during the same period, expended in minor repairs, weed cutting, and for the care, protection and preservation of its line of levee $10.75, and in wooden drains or flumes, drain ditches, etc., $309.82.

Some 18 miles of the line of levee required in this district has been completed, leaving some 15 miles still to be done. In addition some 1.75 miles of cross levee have been constructed by the State, at the following named places, viz: The upper line of Harlem; the lower line of Bohemia, and the upper side of Nestor Canal. The cost to the State of these three lines of cross levee has been $9,923.00. The purposes and objects of these cross levees are twofold: First, to subdivide the area reclaimed into smaller areas, to lessen the danger of total overflow to the district at large in the event of a break or disaster in the main line of levee; second, permitting, upon the completion of the system, a more comprehensive and better system of drainage than that at present designed.

12. *The Caddo Levee District:* All alluvial land, and all lands subject to or liable to overflow from the waters of Red River, or its tributaries, or its outlets, situated in the Parish of Caddo, not including such lands as occur within the corporate limits of the City of Shreveport, are embraced within the boundaries of this district.

The affairs of the district are conducted by a Board of Commissioners consisting of seven members.

The domicile of the district is at Shreveport, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $60.00 per mile of railroad; and 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000. of which $299,800 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $1,327,369 and $1,762,155, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district and the State, was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST.
	New Levee Built	Levee Raised and Enlarged		
By the District	0.89	....	58,614	$ 8,572.95
By the State	5.10	0.16	403,665	72,913.15
Totals	5.99	0.16	462,279	$81,486.10

The amount and cost of the levee work still remaining, at this time, under existing contracts to be done in the district is as follows:

By the district, 135,000 cubic yards amounting to $15,795.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, protection and preservation of its lines of levee $169.30.

The condition of the levees in the Caddo Levee District is, in general, excellent, due to the fact that the greater part of the system is fenced off for pasturage, during low water seasons, thus keeping the weeds and other rank growth down, and permitting the Bermuda grass to thrive and protect the levee from rain and wave wash. The exceptions to the generally excellent condition of the system occur where no pasturage is provided for, or where the grass is worn off at crossings, paths, etc.

By reference to the table in Appendix "C," it will be seen that, while Red River at no time during the past two years reached a stage within several feet of the highest of record, yet, several times the river stood against the dikes and levees along low places to considerable depths. These minor flood stages of Red River were sufficient, too, to cause considerable caving of the banks, and, in some instances, loss of portions of the levee line. New levees had to be constructed where this caving threatened the system. At one point, about 53 miles above Shreveport, by river, known as Rattling Slough, caving threatened a mile of very large levee, and for fear that there might not be time in which to construct a new levee further back, before the front levee was breached, aid was asked of the Federal Government, result-

ing in the construction by the United States of several permeable spur dikes for the protection of the banks. These spurs, however, were unfortunately partially wrecked during a subsequent rise in the river—not, however, until they had checked the caving there sufficiently to permit the construction of a new levee by the State. In fact, the front line of levee is still unbreached.

It would be of great service to Red River if an efficient plant for doing bank protection work could be inaugurated and maintained by the United States Government, prepared to promptly do work where cut-offs and serious breaches of the banks and levees threaten to endanger the regimen of the river. To continually fall back with the levee line on a river which shifts as rapidly as Red River, entails losses which overtax the combined resources of the district and the State. Yet should the district and the State, for any reason, fail to maintain the continuity of the levee system, the regimen of the river would most undoubtedly suffer. Hence the interest of the United States in arresting caving as above referred to.

Owing to insufficiency of funds, such levees as were found to be necessary, during the past two years, had to be constructed with reduced width of crown and steeper sides slopes than would otherwise have been recommended. The grade of these levees was also reduced, where it seemed safe to do so.

The most interesting feature of the work in this district, since the last biennial report of the Board of State Engineers, is the extension of the upper Caddo Levee system from Gold Point to Twelve Mile Bayou, a distance of nearly five miles. Two miles have been completed for some time, but the district has only just let a contract for the remaining three miles. This will bring the system down to the lower limits of the district, as fixed by the Board of Commissioners of the Caddo Levee District, upon the report of the Board of State Engineers, under Act 90 of 1894.

13. *The North Bossier Levee District:* All the alluvial lands subject to or liable to overflow from the waters of Red River, or its tributaries or outlets, in the Parish of Bossier, bounded on the north by the Louisiana-Arkansas State line, on the east by the hills or uplands, on the south by the southern boundary of sections nine (9), ten (10), eleven (11) and twelve (12) of Township twenty-two north, range fourteen west, and on the west by Red River, are embraced within the boundaries of this district.

The control and management of the district is vested in a Board of Commissioners, consisting of five members.

The domicile of the district is at Plain Dealing, Bossier Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district, are as follows, viz:

Tax: A district levee tax of 10 mills on the dollar of the assessed valuation of all of the property in the district subject to taxation for levee purposes.

Forced Contributions: Fifteen cents per acre on all land; $100 per mile of railroad lines; $1.00 per bale of cotton.

The authorized bonded debt of the district, none of which is yet outstanding, is $200,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $24,300 and $42,675, respectively.

No levee work has yet been undertaken in this district, by the district or the State, due to the fact that its Board of Commissioners is waiting upon the Long Prairie Levee Association of Arkansas to complete its system down to the State line. The North Bossier Levee District, owing to its location and geographical configuration, naturally forms the lower end of a Levee District which should have its head at Long Prairie, in Arkansas, and its lower end at Posten Bayou, in Louisiana. But the fact that part of the district was in one State and part in another, precluded the practicability of forming it into one Levee District. This was especially so as that part in Louisiana (the lower end) is much the smaller. An understanding has, however, been reached to the effect that just as soon as the Arkansas District completes a continuous levee system from the highlands at Long Prairie down to the Louisiana line, the North Bossier Levee District will take up the work and continue the levee on down as far as its resources will permit.

The Arkansas district has about 8 miles of levee yet to build, and the contractors now at work expect to complete the line before the end of the year.

14. *The Bossier Levee District:* All alluvial lands subject to or liable to overflow from the waters of Red River, or its tributaries or outlets in the Parish of Bossier, south of the line dividing the north half from the south half of Township 20 North are embraced within the boundaries of this district.

The affairs of the district are conducted by a Board of Commissioners, consisting of seven members.

The domicile of the district is at Bossier City, Bossier Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents on every acre of land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000, of which $249,900 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $1,786,720 and $1,714,768, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district and the State, was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST.
	New Levee Built	Levee Raised and Enlarged		
By the District	0.98	....	106,502	$20,151.52
By the State	3.93	....	381,871	81,326.64
Totals	4.91	....	488,373	$101,478.16

All levee work undertaken in this district during the past two years has been completed.

In addition to the foregoing, the district, during the same period, expended $336.75, in minor repairs, and for the care, protection and preservation of its line of levee.

The medium stage of water in Red River during the past two years, resulted in only a moderate amount of caving along the Bossier Levee District front during that time. In several bends, however, acute conditions developed and rapid caving took place. At Gilmer Lane, Pruitt's and Scopini, the points on the opposite side of the river caved off with sudden and great rapidity, relieving the Bossier levee system opposite these points. On the other hand, opposite Taylortown, Dortch Bend reached an acute stage of caving and forced the Bossier Levee District, in conjunction with the State to undertake the construction of an extensive line of new levee, which proved unusually difficult to build, owing to the fact that parts of the new levee had, in places, to be located across lakes and arms of old rivers, the bottoms of which proved to be unstable. The lake bottoms sup-

ported the weight of the embankment up to a certain height, beyond which the superficial crust over the soft deposit yielded, and the new material placed upon it sank into the softer deposit. The only remedy was to displace this soft material, in doing which a considerably greater quantity of earth than was at first contemplated had to be used, and the base of the dikes spread out to a width of between five and six hundred feet. These dikes, however, finally came to a state of rest. Some further settlement will no doubt take place, but it is hoped that this will prove to be inconsiderable.

Some parts of the Bossier Levee system have been abused, by allowing the construction of hog pens and hog pastures on the levee. Such carelessness in the maintenance of the levees cannot be too severely condemned. For the most part, however, the levees are pastured by cattle, and are well sodded and free of weeds and other growth.

15. *The Red River, Atchafalaya and Bayou Boeuf Levee District:* Under the Act of incorporation of this district ,all the territory in the Parishes of Rapides and Avoyelles, and in that part of the Parish of St. Landry, situated between the Atchafalaya River on the east, and Bayous Boeuf and Courtableau on the west and south is subject to its operations.

During the years 1890 and 1891, however, by due process of law, all that section of Rapides Parish, above Alexandria, bounded by Bayous Rapides and Jean de Jean, and Red River, and all parts of the Parish of Avoyelles, situated on the left bank of Red River, as well as that part of the parish bounded by Bayou des Glaizes, the Atchafalaya and Red Rivers, and the public road running from David's Ferry, on Red River, to Bayou des Glaizes, by way of Marksville, Mansura, and the "Long Bridge," at Bout du Bayou, have been exempted from the operations of the Act of incorporation of the district.

The affairs of the district are conducted by a Board of Commissioners consisting of three members, one from each parish in the district.

The domicile of the district is at Alexandria, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all lands and other property in the district subject to taxation for levee purposes.

Forced Contributions: Five cents per acre on all land in the district; $60.00 per mile of railroad.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $6,440,545 and $6,741,330, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district and the State was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST.
	New Levee Built	Levee Raised and Enlarged		
By the District	2.20	....	145,119	$31,926.18
By the State	1.64	3.35	229,030	49,366.06
Totals	3.84	3.35	374,149	$81,292.24

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is approximately as follows:

By the district, 99,881 cubic yards amounting to $21,973.82.

In addition to the levee work proper, shown in the foregoing table to have been done in the district, during the past two years $2,396.19 was expended by the district in minor repairs, and for the care protection and preservation of its line of levees and drainage channels; $800.74 in bulkheads to protect the lower end of the system on the Atchafalaya River, during high water. Also $42,935.98 in extending drainage channels, the contracts for which, entered into during this period, are not yet completed, involving further payments amounting to as much as $96,285.85.

No new levees in this district were rendered necessary by caving banks during the past two years, and the operations of the district and the State were confined to the extension of the levee system on the Atchafalaya River, and to the standardizing of the system on Red River. The district also added materially to the length of its drainage system.

The levee on the Atchafalaya River now extends down to the Colorado Southern crossing at Latanier, or Krotz Springs, which is about 12 miles below Melville. Its further extension at this time is interrupted only by high water.

From Alexandria down Red River for a distance of a little over 16 miles, the levee has been brought up to standard grade and section, the lower three miles of which was completed during the past two years.

Since the last biennial report of the Board of State Engineers, the district has adjudicated a contract for improving drainage from Bayou Jack to Bayou Courtableau, which work is now well under way. This work will complete the main artery for improving drainage from "Big Bend," on Bayou des Glaizes, to the lower end of the district.

16. *The Red River and Bayou des Glaizes Levee and Drainage District*: All lands in the Parish of Avoyelles situated between Red River, the Atchafalaya River, Bayou des Glaizes, and the public road running from David's Ferry or Moncla's Ferry, on Red River, to Bayou des Glaizes, by way of Marksville, Mansura and the "Long Bridge," at Bout du Bayou, subject to overflow, are included in this district.

The affairs of the district are conducted by a Board of Commissioners, consisting of three members.

The domicile of the district is at Marksville, Avoyelles Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar upon all of the property in the district subject to taxation for levee and drainage purposes.

Forced Contributions: Five cents per acre on all land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000, all of which is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1906 and 1907, was $615,420 and $597,550, respectively.

The amount and cost of the levee work done in the district, during the past two years, was as follows:

WORK DONE.	Miles of New Levee Built	Cubic Yards of Earthwork	COST.
By the District	8.28	474,682	$69,920.66

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the districts (so far surveyed) is approximately as follows:

By the district, 27,900 cubic yards, amounting to $4,109.67.

In addition to the levee work proper, shown by the foregoing table to have been done in the district, during the past two years, $372.20 was expended by the district in minor repairs, and for the care, protection and preservation of the levees, and $447.20 in protection work during high water.

The levee system in this district has been completed continuously from its head, at David's Ferry, down stream to Lake St. Agnes, a distance of about 21 miles. The greater part of this line was constructed during the past two years. The prosecution of the work has never ceased except during times of high water. The work is now suspended pending the subsidence of the present high stage of the river.

Caving in this district has been slight up to the present time; but, owing to the fact that the Saline Levee and Drainage District is leveeing the opposite bank of the river, and that Bougere crevasse on the Mississippi River is or soon will be closed, a swifter current along this part of Red River may be expected in the future and consequently more caving.

As the levees in the district were built with reduced section, the steep slopes did not offer the best opportunity for the Bermuda grass to grow, but notwithstanding this the levees are in good condition and free from weeds and other growth.

17. *The Saline Levee and Drainage District:* All the territory in Avoyelles Parish, consisting of the alluvial lands subject to overflow within the following limits, is embraced within the district, to wit: Beginning at Cassandria on the line between Sections 44 and 50, Township 3 North, Range 3 East, thence down Red River to Saline Bayou; thence following Saline Bayou, Saline Lake and Horse Pen Creek, to line between Sections 17 and 18, Township 4 North, Range 3 East, thence south to the Point Maigre hills, and following the east edge of said hills to the point of beginning.

The affairs of the district are conducted by a Board of Commissioners consisting of three members.

The domicile of the district is at Marksville, Avoyelles Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar upon all the prop-

erty in the district subject to taxation for levee and drainage purposes.

Forced Contributions: Five cents per acre on all land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000.00, of which $100,000 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1907, was $118,880.

The amount and cost of the levee work done in the district during the past two years, was as follows:.

WORK DONE.	Miles of New Levee Built.	Cubic Yards of Earthwork	COST.
By the District	9.09	340,296	$52,405.58

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the district, 45,000 cubic yards, amounting to $9,900.00.

In addition to the levee work proper, shown in the foregoing table to have been done in the district during the past two years, $1,637.00 was expended by the district, in monor repairs, and for the care, protection and preservation of the levees.

This levee system was started at the upper end of the district, at Cassandria Hill, and, during the first season, was constructed continuously down stream for a distance of about 4 miles, except for a gap at the Experiment Plantation crevasse, unavoidably left open. This gap has since been closed and the work extended all the way down to Point Maigre settlement, a dis ance of about 9 miles. Under a second contract, recently entered into, this is at the present time being extended further down stream. Some of this work has suffered considerably from rain wash, but, for the most part, the system is properly grassed and in good condition.

18. *The Courtableau Levee District:* Is composed of an area of about 76 square miles in the Parish of St. Landry, south of Bayou Courtableau, and east of the "back lines of grants on the Teche."

The district fronts on Bayou Courtableau and the Atchafalaya River, and, at the time of the organization of the Board of Levee

Commissioners, consisting of three members, it was estimated by the Board of State Engineers that lines of levee would be required on these streams which would cost not less than $140,000. Therefore, in view of the limited area of the district, the small amount of revenue which it could, under the law, possibly supply, and the fact that, under any circumstances, high water in the Atchafalaya River would pass around the lower end of the levee and overflow a considerable part of the district with "back water," it was wisely concluded by the Levee Commissioners, at a meeting on October 2, 1902, to take no immediate action for undertaking levee work. This action has not since been reconsidered.

The domicile of the district is at Washington, La.

The authorized bonded debt of the district is $40,000.

Bayou Lafourche.

During the past two years, the joint organization of the Atchafalaya Basin and Lafourche Levee Boards, which is charged with certain improvements on Bayou Lafourche, has devoted much attention to the Lafourche project. In accordance with the requirements of the War Department, the plans for the lock at Donaldsonville have been thoroughly revised, redrawn, submitted to the War Department, and approved by it. Proposals for the construction of said lock were invited, but owing to the character of the securities offered in payment for the work, no bids were received. The levee districts then invited from bankers and capitalists proposals to purchase or carry the securities which they could offer in payment for this work, but, owing probably to the unsettled financial conditions in the country, no offer was received for the purchase or negotiation of these securities.

The joint organization has, with the dredge which it owns, constantly worked in dredging Bayou Lafourche, and in maintaining therein the six feet of water required by law.

In order to increase the flow of fresh water into Bayou Lafourche, the opening of a canal between Bayou Lafourche and Lake Verret has been undertaken. This canal, which, when completed, will be about 8 miles long, begins at a point about 4 miles below Napoleonville, on the west bank of Bayou Lafourche, and extends to a point situated near the southeastern corner of Lake Verret. There are two contractors now working on this canal, with three dredges, and it is anticipated that it will be completed before the coming grinding

season. The completion of this canal will involve the excavation of some 450,000 cubic yards.

Owing to objections from crafts navigating Bayou Lafourche, the needle dam which has been built by the joint organization just above Harang Canal, had to be blown up, under orders from the War Department, to whom these complaints had been made.

The completion of the Harvey Canal locks and the improvement of the Company Canal locks, taken in connection with the opening into Bayou Lafourche of the Harang and Company Canals, have given access to navigation into Bayou Lafourche from the Mississippi River. There is now a regular packet line running from the wharves of New Orleans through these locks and canals into Bayou Lafourche, and giving water transportation into Bayou Lafourche from the Mississippi River, and vice versa, at all times of the year. In this way it must be recognized that not only navigation has been restored in Bayou Lafourche, but materially improved since its closure by the dam at Donaldsonville.

New Basin Canal and Shell Road.

The Board of Control of the New Basin Canal and Shell Road has decided lately to undertake some extensive and much needed repairs to the west jetty, extending into Lake Ponchartrain, in prolongation of the west bank of the canal. This jetty, which had been badly damaged by the storms which occur in Lake Ponchartrain, has become beyond maintaining. The Board of State Engineers has been called upon to prepare plans and specifications for the construction of a new jetty, which will not only be of a stronger and more permanent character, but which will be built on lines affording greater ease to vessels entering this canal, which is a most important adjunct to the commerce of New Orleans. The Board of State Engineers has prepared elaborate plans for the construction of this jetty, and in a few days proposals for the construction of this work will be received and opened by the Board of Control.

The points of reference determining the boundaries of the State property under the jurisdiction of the Board of Control on the New Basin Canal and Shell Road which were established by the Grandjean survey of 1800 were of such a temporary character that most of them have been lost or obliterated. It has become necessary to reestablish these boundary lines and the Board of Control has called on the Board of State Engineers for such a survey.

The survey is now being carried on, and several vexatious questions as to the ownership of property will be settled thereby. The management of the canal has been maintained at its usual high standard, and the condition of the property of the State, controlled by the Board of Commissioners of the New Basin Canal and Shell Road, gives evidence of the efficiency of its government.

DRAINAGE.

The urgent need of better drainage in Louisiana continues to appeal forcibly to all concerned in the further prosperity and welfare of the State, and the consideration and discussion of projects to bring about comprehensive results in that direction to constantly gain fresh impetus.

The tendency, however ,for those whose special interest is centered in localities, to proceed upon lines prompted solely by local considerations, unfortunately, still largely prevails. This tendency was so manifest when the last biennial report of the Board of State Engineers was submitted, that the Board was then prompted to say:

"To go further into this matter the Board of State Engineers also feels called upon to express an opinion adverse to the present tendency to organize small drainage districts, so far apparently appealing to localities.

"It is not believed that the formation of small districts anywhere can ultimately prove satisfactory. On the contrary, it is believed in the very nature of things, that they will eventually prove sources of serious conflict, controversy and complications."

In the opinion of the Board of State Engineers, the conclusions then arrived at, become, in the light of passing experience more and more justified.

During the past two years, quite a number of projects for improving drainage in various parts of the State have been advanced. In the consideration of a number of these, the services of the Board of State Engineers have, under Act 103 of 1906, been called into requisition; but, owing to the inability of the drainage districts to supply immediate means with which to meet expenses, as required by the same law, not always extended.

The Board of State Engineers being provided with appropriations to defray only the expenses of surveys and other engineering work connected with levee construction, was compelled, when called upon by the drainage districts for investigations, surveys, etc., to require

the drainage districts to not only prepare to meet the cost of same, as provided in law, but to advance the amount needed.

In nearly every instance, the taxes permitted by law for drainage purposes had not yet been levied, and, of course, not collected at the time of the request, thereby leaving the drainage district entirely unprovided with funds with which to comply, except by private subscription, generally most difficult to obtain.

It, therefore, occurs to the Board of State Engineers that in the consideration of drainage projects, a very important step should precede the stage of actual organization—that is, investigation, thorough inspection and survey, by some competent authority or body, of the merits of the project, and its influence upon sections of country not therein included.

The incorporation of any drainage district, before the merits of the project, considered locally, have been fully weighed and established by competent authority, through investigations and survey, and its effect as well upon other sections of country determined, must, in the opinion of the Board of State Engineers, necessarily result in narrowness of scope and effectiveness, if nothing more serious. But this view is not likely to be generally accepted until laws are passed requiring, primarily, that each and every drainage proposition shall, before reaching the stage of district organization, be submitted to a State Commission of inquiry.

This Commission, composed say of at least one property owner from each of the well-known and well-defined basins in the State, if not required to formulate a general plan for a comprehensive system of drainage for the State at large, should, at all events, be authorized and empowered, with the advice of the Board of State Engineeers, to pass upon all drainage propositions—no proposition to enjoy the privileges conferred by law upon districts organized for drainage purposes until it has been submitted to and endorsed by the State Commission. After endorsement, or approval by the State Commission, the processes provided by law for the organization of drainage districts might then govern.

Viewed from the standpoint of common interest, the principal basins in the State that suggest themselves for consideration in matters of public drainage are, in the opinion of the Board of State Engineers, as well defined as the levee districts, and the formulation of plans for drainage for the State at large, without giving careful and exhaustive thought to the geographical and topographical unity

and relations of these basins, can hardly be expected to prove ultimately comprehensive and satisfactory.

Though not by any means including all localities in the State where attention to drainage is demanded, these basins, tentatively considered, may, in general terms, be described as follows, viz.:

Contiguous to the Mississippi River, west bank:

1. All low lands subject to overflow within the area extending from the Arkansas-Louisiana line to the mouth of Red River, between the Mississippi River, on the east, and Bayou Macon, Deer Creek, Ouachita River, Black River, and Red River to the west and south.

2. From the mouth of Red River to Bayou Lafourche, between the Mississippi River, Bayou Lafourche, the Gulf of Mexico and the Atchafalaya River.

3. From Bayou Lafourche to the mouth of the Mississippi River, between the Mississippi River, the Gulf of Mexico, and Bayou Lafourche.

Contiguous to the Mississippi River, east bank:

1. All low lands subject to overflow within the area extending from Baton Rouge to a point near New Orleans, controlled say by the Metarie Ridge, between the Mississippi River, Bayou Fontaine, Amite River, Lake Maurepas and Lake Pontchartrain.

2. The corporate limits of the City of New Orleans.

3. All low lands subject to overflow within the area extending from New Orleans to the mouth of the Mississippi River, between the latter, and Lake Pontchartrain, Lake Borgne and the Gulf of Mexico.

Contiguous to the Ouachita River:

1. All low lands subject to overflow within the area extending from the Arkansas-Louisiana line to the junction of the Ouachita and Boeuf Rivers, between the highlands west of the Ouachita River and east of Boeuf River.

2. From the junction of the Ouachita and Boeuf Rivers to the mouth of Black River, between the Ouachita, Black and Red Rivers, and the highlands of Catahoula and Rapides Parishes.

Contiguous to Red River, west bank:

1. All the low lands subject to overflow within the area extending from the Arkansas-Louisiana line to Shreveport, between Red River on the east and the highlands on the west.

2. From Shreveport to Grand Ecore, between Red River and the highlands.

3. From Grand Ecore to Alexandria, between Red River and the highlands.

4. From Alexandria to the mouth of Red River, between Red River, the Atchafalaya River, Bayou Courtableau and Bayou Boeuf.

5. All low lands subject to overflow between Bayou Courtableau, the Atchafalaya River, and Bayou Teche, south of Washington, La.

Contiguous to Red River, east bank:

1. All low lands subject to overflow within the area extending from the Arkansas-Louisiana line to Miller's Bluffs, between Red River and the Bluffs.

2. From Hurricane Bluff to Loggy Bayou, between Red River on the west, and the highlands, skirted by Red Chute, and Flat River on the east, and Loggy Bayou on the south.

3. From Loggy Bayou to St. Maurice, between Red River and Saline River.

4. From St. Maurice to Pineville—numerious comparatively small isolated areas between Red River and the highlands.

5. From Pineville to Cassandria—numerous comparatively small isolated areas, between Red River and the highlands.

The Pearl River Basin.

The Southwest Louisiana Basin: South of a line running west from Washington, La., and lying between Bayou Teche and the Atchafalaya River on the east, and the Texas-Louisiana line on the west, including the sub-basins physically controlled by the Vermillion River, the Nezpique and Mermentau Rivers, the Calcasieu River, and the Sabine River.

The creation of a State Commission on Drainage, provided with appropriations for administration, and to meet expenses of investigations, preliminary surveys, etc., would, in the opinion of the Board of State Engineers, remedy, for all parties concerned, the impracticable mode of proceedure now for the most part governing in the premises.

As to the special fund from which such an appropriation should be made, the Board of State Engineers cannot well advise; but there is no division of opinion among its members in asserting that no part of the funds provided for levee purposes should be so applied, as was proposed in a bill presented to the General Asembly in 1906, which, fortunately for levee needs and levee construction, failed of passage.

STAGES OF THE RIVERS.

From the following table, showing the highest water of record, as well as the stages attained in 1906, 1907 and 1908, up to April 20, 1908, or date of this report, at stations mostly governing conditions affecting Louisiana, it will be seen that, though stages were reached in 1907, at several stations on the Mississippi River, closely approximating the highest of record, notably at Lake Providence and New Orleans, and somewhat exceeding the highest of previous record at Memphis, Tenn., and Fort Jackson, La., no extreme flood stage prevailed generally during the past two years.

While this is a fact, it must, on the other hand, be borne in mind that, during this period, stages were, nevertheless, reached in all the streams in the State, which, in former years, before the great improvement made in its levee lines, would have subjected the State to serious inundations.

Flood conditions, which, in past years, before systematic and comprehensive operations on the part of the levee authorities, were, throug lack of revenues, possible, would have caused great alarm throughout the State, are now carried to the sea without concern, and often without even the least knowledge or appreciation of the fact by any but those engaged in attending to the levee work of the State.

Table comparing the high waters of 1906, 1907 and 1908 (to April 20) with the highest water of record at the stations named:

LOCALITY	Highest Water of Record		High Water 1906		High Water 1907		High Water 1908 (to April 20)	
	Gauge Reading	Year	Gauge Reading	Below Highest Water	Gauge Reading	Below Highest Water	Gauge Reading	Below Highest Water
MISSISSIPPI RIVER.								
Arkansas City, Ark.	52.90	1903	50.00	2.90	52.10	0.80	48.20	4.70
Greenville, Miss.	49.10	1903	44.90	4.20	47.30	1.80	42.50	6.60
Lake Providence, La.	46.48	1903	43.70	2.78	46.30	0.18	42.60	3.88
Vicksburg, Miss.	52.48	1897	47.15	5.33	49.60	2.88	46.90	5.58
St. Joseph, La.	48.07	1903	43.75	4.32	46.20	1.87	43.60	4.47
Natchez, Miss.	50.35	1903	46.70	3.65	48.90	1.45	46.90	3.45
Red River Landing, La.	50.20	1897	44.70	5.50	46.90	3.30	45.30	4.90
Baton Rouge, La.	40.65	1897	34.40	6.25	37.40	3.25	35.60	5.05
Donaldsonville, La.	32.75	1897	27.40	5.35	30.00	2.75	28.40	4.35
Carrollton, La.	19.42	1903	16.00	3.42	18.70	0.72	16.88	2.57
Fort Jackson, La.	8.30	1907	7.10	1.20	8.30	0.0	7.50	0.80

LOCALITY	Highest Water of Record		High Water 1906		High Water 1907		High Water 1908 (to April 20)	
	Gauge Reading	Year	Gauge Reading	Below Highest Water	Gauge Reading	Below Highest Water	Gauge Reading	Below Highest Water
RED RIVER								
Fulton, Ark.	33.75	1876	30.85	4.90	31.40	4.35	30.60	5.15
Shreveport, La.	35.70	1892	22.80	13.10	26.90	8.90	19.00	16.70
Alexandria, La.	38.25	1892	29.45	8.80	32.00	5.65	26.70	11.55
ATCHAFALAYA RIVER								
Simmesport, La.	50.45	1882	43.30	7.45	45.70	5.25	43.70	7.25
Melville, La.	58.70	1903	56.00	2.70	57.70	1.00	57.20	1.50

In connection with the stages of the rivers since the last biennial report of the Board of State Engineers, a table will be found in Appendix "C" giving the Gauge readings and elevations above Datum of highest and lowest waters at the same stations during the calendar year 1907 and to April 20 of 1908 as compared with the highest and lowest values of previous years.

In Appendix "C" will also be found a table giving records of highest waters at stations and years indicated since 1890.

[illegible] at various points in the State during the period covered by this report, [illegible] at Lake Providence, La., on the right or west bank of the Mississippi River, about 25 miles below New Orleans. This crevasse however was fully closed by March 31st, following a flood reducing any material damage upon and in immediate vicinity. For particulars concerning the causes of the crevasse, [illegible] treatment, etc. see report of the Commission dated Boston, under date of June [illegible], 1907, in Appendix "B."

The Board has no [illegible] matters of immediate river con-[illegible] may [illegible] in the State.

The records of the United States Weather Bureau have compar-[illegible] stations in the State [illegible] high water stages by [illegible] the United States Weather Bureau [illegible] and [illegible] unless further [illegible] the [illegible] during the [illegible] stages [illegible] [illegible] [illegible]

water are likely to develop in the State in the near future, though the present high stages may be prolonged for some time yet, especially on the lower Mississippi River.

APPENDICES.

Tabular statements showing details of the levee work of the past two years, important statistics, and copies of certain special reports and correspondence bearing upon matters of more than ordinary public interest in connection with the levee work of the State, will be found in the Appendices following this Report.

APPENDIX "A."—Tabular statements relative to location, length, quantity and cost of levee work undertaken by the State of Louisiana, the several levee districts of the State, and the United States, in Louisiana and a part of Arkansas, from April 20, 1906, to April 20, 1908.

APPENDIX "B."—Copies of Special Reports, letters, etc., from the Board of State Engineers to Your Excellency, the various Boards of Levee Commissioners, Police Juries, and to others interested in operations generally connected with the Department.

APPENDIX "C."—Statements relative to high water records.

In conclusion the Board of State Engineers wishes to express its appreciation of the efficient and valuable services rendered by its corps of regular employees, namely, Walter H. Hoffman, Secretary; A. C. Duval, Chief Draughtsman; G. W. Lewis, Assistant Draughtsman; A. Gurbet, Assistant Secretary, Stenographer and Typewriter; R. W. Richardson, J. R. Adams, Walter P. Villere, and F. B. Grevemberg, Jr., levelers; and Robert J. Smith, rodman.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

FRANK M. KERR,
Chief State Engineer.
SIDNEY F. LEWIS,
ARSENE PERRILLIAT,
M. P. ROBERTSON,
GERVAIS LOMBARD,
Assistant State Engineers.

WALTER H. HOFFMAN,
Secretary.

Levee work undertaken by the State of Louisiana in the Several Levee Districts, under forty-five contracts entered into from April 20, 1906, to April 20, 1908, with sixteen contracts of earlier date, not completed April 20, 1906.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
				FIFTH LOUISIANA LEVEE DISTRICT.							
1	Ashtabula Pln. to Pilcher's Ldg.	E. Carroll	Sept. 24, 1907								{ Total cost $79,200 { See Dis. contract for $19,272.
	Extend from Arkansas line to Pilcher's Ldg.					25,593	227,000	$59,928.00	26.4	Mississippi Riv.	
2	Cottonwood	E. Carroll	Nov. 21, 1905	Aug. 6, 1907	507	6,990	55,318	9,652.99	17.45	Mississippi Riv.	
3	Longwood	E. Carroll	Nov. 21, 1905			7,170	55,000	8,497.50	15.45	Mississippi Riv.	
	Donna Vista Sec.					6,292	57,379	8,865.05		Mississippi Riv.	
4	Maguire to Hollybrook	E. Carroll	April 1, 1907			26,988	276,000	69,000.00	25.	Mississippi Riv.	
5	Mocancy	Madison	April 2, 1907	Nov. 5, 1907	4,574		139,622	24,782.90	17.75	Mississippi Riv.	
6	Duckport	Madison	Dec. 24, 1907		2,481		45,000	9,000.00	20.	Mississippi Riv.	
7	Bayou Roundaway	Madison	Oct. 20, 1906	June 22, 1907		10,253	51,027	9,184.86	18.	Mississippi Riv.	
8	Lake Palmyra Sec. No. 1	Tensas	Oct. 24, 1905	Sept. 18, 1907	2,325	14,247	135,936	20,050.56	14.75	Mississippi Riv.	
9	Lake Palmyra Sec. No. 2	Tensas	Oct. 24, 1905	Nov. 2, 1906		15,000	89,687	13,228.83	14.75	Mississippi Riv.	
10	Lake Palmyra Sec. No. 3	Tensas	Oct. 24, 1905	Nov. 5, 1906		13,000	65,077	9,598.85	14.75	Mississippi Riv.	
11	Deer Park	Concordia	Oct. 20, 1906	May 17, 1907	4,973		103,661	20,732.20	20.	Mississippi Riv.	
	Totals				14,860	125,533	1,300,707	$262,521.74			
	Less work done previous to Apr. 20, '0		6, and not com	'p'd Apr. 20, 08	1,681	51,971	471,910	112,564.29			
	Work done from April 20, 1906, to April 20, 1908				13,179 or 2.49 miles	73,562 13.93 miles	828,797	149,957.45			{ Average price per { cu. yd., 18.09 cts.

ATCHAFALAYA BASIN LEVEE DISTRICT

12	Raccourci	Pointe Coupee.	Aug. 27, 1907		5,863	11,022	325,000	$ 76,375.00	23.5	Mississippi Riv.		
13	Morganza	Pointe Coupee.	Dec. 28, 1905	Feb. 13, 1908	.....	5,150	122,000	46,360.00	38.	Mississippi Riv.		
	Totals				5,863	16,172	447,000	$122,735.00				
	Less work not completed April 20, 1908				4,600	3,500	149,149	35,050.00				
	Work done from April 20, 1906 to		Apr. 20, 1908.		1,263 or 0.24 miles	12,672 or 2.40 miles	297,851	87,685.00				{ Average price per cu. yd. 29.34 cts.

PONTCHARTRAIN LEVEE DISTRICT

14	Arlington to Conrad	E. Baton Rouge	Jan. 7, 1908		3,000	7,656	140,000	24,266.66	17 1-3	Mississippi Riv.		
15	Hope	St. John	Oct. 31, 1906		2,271	1,888	124,000	26,598.00	21.45	Mississippi Riv.		
16	Gypsy Point	St. Charles	Oct. 3, 1905	Sept. 12, 1906	9,761	11,312	240,561	33,558.25	13.95	Mississippi Riv		
	Totals				15,032	20,856	504,561	84,422.91				
	Less work done previous to Apr. 20, '06 and not completed Apr. 20, '08				9,939	13,090	311,520	50,140.09				
	Work done from April 20, 1906, to April 20, 1908.				5,093 or 0.96 miles	7,766 or 1.47 miles	193,041	34,282.82	.....	.....		{ Average price per cu. yd. 17.76 cts.

LAFOURCHE BASIN LEVEE DISTRICT

17	Lauderdale	St. James	Sept. 24, 1907		1,915	.....	56,000	$ 12,264.00	21.9	Mississippi Riv.		
18	St. Louis	St. James	Sept. 24, 1907		1,290	.....	52,300	11,976.70	22.9	Mississippi Riv.		
19	Jack Strange	St. John	Dec. 19, 1905	Dec. 29, 1906	4,350	.....	141,982	}	18.95	Mississippi Riv.		
	Stevenson Section				2,063	2,700	69,367	} 40,050.63		.....		
20	La Reussite	Plaquemines	Aug. 1, 1905	Dec. 20, 1907	1,105	.....	13,248	2,217.71	16.74	Mississippi Riv.		
21	Woodland	Plaquemines	Oct. 29, 1907		.....	3,500	18,500	6,660.00	36.	Mississippi Riv.		
	Totals				10,723	6,200	351,397	73,169.04	.....			
	Less work not completed April 20, 1908				3,205	800	113,181	25,997.86	.....			
	Work done from April 20, 1906, to		Apr. 20, 1908		7,518 or 1.42 miles	5,400 or 1.02 miles	238,216	47,171.18	.....	.....		{ Average price per cu. yd. 19.80 cts.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
			LAKE BORGNE BASIN LEVEE DISTRICT								
22	Chalmette	St. Bernard	Sept. 25, 1906	Jan. 13, 1908	540	3,510	15,277	3,819.25	25.	Mississippi Riv.	
23	Cnernarvon	Plaquemines	Sept. 25, 1906	Mar. 2, 1908	.....	5,480	25,840	6,460.00	25.	Mississippi Riv.	
24	Martin	Plaquemines	Oct. 10, 1905	Jany 10, 1907	2,188	636	32,555	5,575.04	17 1/8	Mississippi Riv.	
25	Upper Bohemia	Plaquemines	Oct. 16, 1907	.....	2,350	.....	25,000	6,247.50	24.99	Mississippi Riv.	
26	Lower Bohemia	Plaquemines	Oct. 16, 1907	.....	.....	4,950	43,000	10,105.00	23.5	Mississippi Riv.	
	Totals	.....	.....	.....	5,078	14,576	141,672	32,206.79	.....		
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, 08.				1,300	1,850	37,854	7,848.65	.....		
	Work done from April 20, 1906, to April 20, 1908			.....	2,778 or 0.71 miles	12,726 or 2.41 miles	103,818	24,358.14	.....	.....	Average price per cu. yd. 23.46 cts.
			GRAND PRAIRIE LEVEE DISTRICT								
27	Waltzer	Plaquemines	Dec. 10, 1907	Mar. 16, 1908	885	.....	7,343	1,798.56	24.48	Mississippi Riv.	
28	Waltzer to Nestor Canal	Plaquemines	Oct. 10, 1905	Nov. 23, 1906	.....	10,355	40,292	6,312.41	15 2/3	Mississippi Riv.	
29	Point Pleasant	Plaquemines	Oct. 16, 1907	.....	.....	3,815	15,000	8,070.25	26 1/3	Mississippi Riv.	Includes $4,120.20 for revetment.
30	Old Quarantine Revetment	Plaquemines	Dec. 10, 1907	Mar. 18, 1908	.....	.....	.....	3,892.95	$1.23	Per linear foot.	Total estimated cubic yards, 85,000. Cost $13,300, $1,500 to be paid by Grand Prairie Levee District and $1,000 by Oyster Commission.
31	Lower Grand Prairie	Plaquemines	Oct. 31, 1906	Feb. 22, 1907	6,661	4,486	44,666	9,379.86	21.	Mississippi Riv.	
32	Baptiste Collette Gap	Plaquemines	Oct. 1, 1906	.....	6,780	.....	28,421	10,800.00	38.	Mississippi Riv.	
	Totals	.....	.....	.....	14,326	18,656	135,722	40,253.98	.....		
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, '08.				6,780	8,075	56,050	16,949.84	.....		
	Work done from April 20, 1906, to April 20, 1908			.....	7,546 or 1.43 miles	10,581 or 2.00 miles	79,672	23,304.14	.....	.....	Average price per cu. yd. 23.75 cts.

BURAS LEVEE DISTRICT

33	Orange Farm.....	Plaquemines .	Oct. 10, 1905	July 30, 1906	1,700	.....	21,136	5,072.64	24.	Mississippi Riv.	
34	Kamlah	Plaquemines .	Sept. 25, 1906	Jan. 23, 1908	2,745	.....	25,509	4,761.68	18⅞	Mississippi Riv.	
35	Kamlah Revetment....	Plaquemines .	Oct. 29, 1907	.....	.....	.....	.....	2,818.08	.....	Mississippi Riv.	$1.03 per linear ft.
36	McDonogh Farm.....	Plaquemines .	Sept. 25, 1906	Jan. 23, 1908	1,385	.....	12,475	2,328.66	18⅞	Mississippi Riv.	
37	McDonogh Farm Revetment	Plaquemines	Oct. 29, 1907	.. ..	.....	.....	.....	1,454.25	.....		$1.03 per linear ft.
38	Clinton	Plaquemines .	Sept. 25, 1906	.....	257	1,606	13,300	3,228.66	19⅛	Mississippi Riv.	
	Bougon Section.....	.....	Sept. 25, 1906	.....	424	.....	3,400		.....		
39	Molzant	Plaquemines ..	Oct. 29, 1907	Feb. 25, 1908	1,120	.....	9,436	4,356.04	32½	Mississippi Riv.	Includes $1,289.34 for revetment.
40	Pelas	Plaquemines ..	Oct. 29, 1907	Feb. 25, 1908	1,583	.....	12,250	5,778.70	32½	Mississippi Riv.	Includes $1,797.45 for revetment.
	Totals	.....	.....	.....	9,214	1,606	97,506	29,798.71	.....		
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, '08				1,581	.....	15,374	3,409.19	.....		
	Work done from April 20, 1906, to April 20, 1908..			.....	7,633 or 1.44 miles	1,606 or 1.30 miles	82,132	26,389.52	.....	.....	Average price per cu. yd. 23.17 cts.

PLAQUEMINES PARISH, EAST BANK LEVEE DISTRICT

41	Bohemia Side.....	Plaquemines .	May 10, 1906	Aug. 20, 1906	3,665	.....	16,085	3,120.49	19.4	Mississippi Riv.	
42	Nestor Canal.....	Plaquemines .	Sept. 24, 1907	Feb. 25, 1908	2,958	.....	16,412	3,774.76	23.	Mississippi Riv.	
	Totals, work done from Apr. 20, 1906, to April 20, 1908				6,623 or 1.25 miles	.....	32,497	6,895.25	.....	.....	Average price per cu. yd. 21.22 cts.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		Cubic Yards	Cost	Price—Cents	Stream	REMARKS
			Contract	Final Certificate	New Levee	Enlargement					
				CADDO LEVEE DISTRICT							
43	Missionary	Caddo	Nov. 23, 1905	July 21, 1906	5,264	.....	67,218	9,007.21	13.4	Red River	
44	Rattling Slough	Caddo	Aug. 29, 1907	Apr. 3, 1908	4,500	.....	113,637	25,454.68	22.4	Red River	
45	Cairo	Caddo	Jan. 7, 1908	Apr. 3, 1908	1,590	853	19,354	2,177.32	11.25	Red River	
46	Gold Pt. Place to Cash Pt. Place	Caddo	Oct. 31, 1906	Aug. 27, 1907	6,842	.....	88,107	17,480.42	19.84	Red River	
47	Shreve's Island	Caddo	Oct. 5, 1905	July 21, 1906	4,867	.....	43,563	4,922.62	11.3	near River	
48	Dixie	Caddo	Sept. 24, 1907	Jan. 28, 1908	2,784	.....	38,328	6,695.90	17.47	Red River	
49	Long Branch	Caddo	Oct. 26, 1905	June 13, 1906	2,842	.....	37,015	5,182.10	14.	Red River	
50	Brown Place	Caddo	Nov. 23, 1905	July 28, 1906	1,672	.....	20,957	2,514.84	12.	Red River	
51	Loggie Lea	Caddo	Sept. 25, 1905	Mar. 21, 1907	2,033	.....	31,595	5,939.86	18.8	Red River	
52	Whitehall	Caddo	Sept. 25, 1906	Apr. 13, 1907	3,065	.....	16,701	2,668.82	15.98	Red River	
	Totals	.....	.....	.....	35,459	853	476,475	82,043.77	.....	.....	
	Less work not done previous to April		20, 1906.....	.....	8,531	.....	72,810	9,130.62	.....	.....	
	Work done from April 20, 1906, to		April 20, 1908	.....	26,928 or 5.10 miles	853 or 0.16 miles	403,665	$ 72,913.15	.....	.....	Average price per cu. yd. 18.06 cts.

BOSSIER LEVEE DISTRICT

53	Riverside	Bossier	Sept. 25, 1905	Mar. 21, 1907	3,493	.....	49,098	$ 7,855.68	16.	Red River		
54	Colquitt Point	Bossier	Nov. 23, 1905	Sept. 5, 1906	2,934	.....	29,804	3,397.77	11.40	Red River		
55	Pat Cash Place	Bossier	Dec. 3, 1907	Feb. 22, 1908	3,722	.....	21,130	2,419.38	11.45	Red River	{ Total 296,771 c. y.	
56	Chalk Level	Bossier	Oct. 31, 1906	May 23, 1907	2,460	.....	23,586	3,679.41	15.60	Red River	{ Cost $72,412.12.	
57	Dortch Bend	Bossier	Aug. 28, 1907	Apr. 6, 1908	9,294	.....	263,984	64,412.12	24.40	Red River	{ $8,000 paid by	
58	China Grove—Christiana	Bossier	Oct. 18, 1905	May 5, 1906	3,274	.....	41,846	5,904.47	14.11	Red River	{ Bossier Lev. Dist.	
	Totals				25,177	.....	429,448	$ 87,668.83	.....			
	Less work done previous to April 20, 1906				4,424	.....	47,577	6,342.19	.....			
	Work done from April 20, 1906 to April 20, 1908.				20,753 or 3.93 miles	.....	381,871	$ 81,326.64	.....		{ Average price per cu. yd. 21.29 cts.	

RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT

59	Slocum to Wilson	Rapides	Sept. 25, 1906	Apr. 13, 1907	.....	7,680	50,207	}	22.			
	Echo Ldg. Sectn				.....	1,000	2,829	} 11,667.92	22.	Red River		
60	Wilson's to Smith's	Rapides	Sept. 24, 1907	Apr. 3, 1908	.....	9,040	63,874	15,329.76	24.	Red River		
61	Bayou Petit Prairie South	St. Landry	Aug. 16, 1905	Sept. 9, 1907	15,530	.....	205,659	41,028.97	19.95	Atchafal'a Riv.		
	Totals				15,530	17,720	322,569	$ 68,026.65	.....			
	Less work done previous to April 20, 1906				6,850	.....	93,539	18,660.59	.....			
	Work done from April 20, 1906, to April 20, '08				8,680 or 1.64 miles	17,720 or 3.35 miles	229,030	$ 49,366.06	.....		{ Average price per cu. yd. 21.55 cts.	
	The above is divided by stream as follows:											
	Red River					3.35 mi.	116,910	26,997.68	.....			
	Atchafalaya River						112,120	22,368.38	.....			
			Totals		1.64 mi 1.64 mi.	3.35 mi.	229,030	$ 49,366.06	.....			

RECAPITULATION.

DISTRICT	Miles of New Levee	Miles of Enlargement	Cubic Yards	COST	REMARKS
Fifth Louisiana Levee District	2.49	13.93	828,797	$140,957.45	
Atchafalaya Basin Levee District	0.24	2.40	207,851	87,685.00	
Pontchartrain Levee District	0.96	1.47	193,041	34,282.82	
Lafourche Basin Levee District	1.42	1.02	238,216	47,171.18	
Lake Borgne Basin Levee District	0.71	2.41	103,818	24,358.14	
Grand Prairie Levee District	1.43	2.00	79,672	23,304.14	
Buras Levee District	1.44	0.30	82,132	26,389.52	
Plaquemines Parish East Bank Levee District	1.25	.....	32,497	6,895.25	
Caddo Levee District	5.10	0.16	403,665	72,913.15	
Bossier Levee District	3.93	.....	381,871	81,326.64	
Red River, Atchafalaya and Bayou Boeuf Levee District	1.64	3.35	220,030	40,366.06	
Totals	20.61	27.04	2,870,590	$603,649.35	

Levee work undertaken by the Board of Commissioners of the Tensas Basin Levee District, under five contracts entered into from April 20, 1906, to April 20, 1908, with two contracts of earlier date not completed April 20, 1906.

Number	Name of Contract	County	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost	Price—Cents	Stream	Remarks
1	Chicot Front.....	Desha Co., Ark.	Sept. 19, 1906	.....	4,900	.....	275,000	$ 66,000.00	24.	Mississippi Riv.	Includes $2,530.26 paid for drain ditch.
2	Chicot Front Extension	Desha Co., Ark.	May 11, 1907	.....	4,500	.....	170,000	31,280.00	18.4	Mississippi Riv.	
3	Chicot Front to Arkansas City.....	Desha Co., Ark.	May 11, 1907	.....	.....	11,500	110,000	30,250.00	27.5	Mississippi Riv	
4	Vancluse North.....	Chicot Co., Ark.	Nov. 9, 1907	.....	.....	13,200	115,000	37,605.00	32.7	Mississippi Riv.	
5	Vancluse to Sunny Side	Chicot Co., Ark.	June 30, 1905	Dec. 1, 1906	.....	28,800	138,454	33,090.50	23.9	Mississippi Riv	
6	Lake Port to Brooks Mill	Chicot Co., Ark.	June 30, 1905	Dec. 3, 1906	.....	25,000	115,755	24,192.79	20.9	Mississippi Riv	
7	Sandy Bayou Dyke and Cypress Slough Dyke	Caldwell Par. La.			810	.....	16,200	3,200.00	24¾	Ouachita.	Total cost $4,009.50; $809.50 to be paid by Police Jury.
	Totals	.....	.....	.....	10,210	78,500	940,409	$225,618.29	.....	.....	.....
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, '08				3,384	43,808	511,512	131,976.17	.....	.....	.....
	Work done from April 20, 1906, to April 20, 1908			.....	6,826 or 1.29 miles	34,692 or 6.57 miles	428,897	$ 93,642.12	.....	.....	Average price per cu. yd. 21.83 cts.
	The above is divided by streams as follows:										
			On Mississippi	River	1.20 mi.	6.57 mi.	419,297	$ 91,266.12		.....	
			On Ouachita	River	.09 mi.		9,600	2,376.00			
			Totals	.....	1.29 mi.	6.57 mi.	428,897	93,642.12			

Levee work under taken by the Board of Commissioners of the Fifth Louisiana Levee District (under fifteen contracts entered into from April 20, 1906 to April 20, 1908, with two contracts of earlier date not completed April 20, 1906.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Ashtabula Pltn. to Pilcher's Ldg..... Includes State Line to Ashtabula Pltn...	East Carroll..	.....	See State Con	tract .	.....	73.000	$ 19,200.00	.....	Mississippi Riv.	Total cost 300,000 cu. yds. $79,200. See State contract for $59,928.
2	Longdoow ..... Donna Vista Sectn..	East Carroll..	.....	See State Con	tract .	.....	.....	1,147.58	.....	Mississippi Riv.	
3	Willow Pnt. Emergency	East Carroll..	.....	Feb. 28, 1907	500	.....	11,441	3,077.62	26.9	Mississippi Riv.	
4	Willow Point Loop....	East Carroll..	May 24, 1906	Mar. 18, 1908	.....	25,575	296,243	79,689.36	26.9	Mississippi Riv.	
5	Cabin Teele Enlargement	Madison	June 20, 1905	Aug. 6, 1906	.....	3,145	9,578	2,011.38	21.	Mississippi Riv.	
6	Reid Biggs.....	Madison	Nov. —, 1907	.....	.....	.....	32,000	9,600.00	30.	Mississippi Riv.	
7	Bedford Emergency....	Madison	.....	Feb. 28, 1907	1,550	.....	21,402	4,280.40	20.	Mississippi Riv.	
8	Bedford	Madison	Jan. 12, 1907	Aug. 20, 1907	483	.....	5,732	974.44	17.	Mississippi Riv.	
9	Bedford	Madison	Mar. 8, 1907	Aug. 20, 1907	8,082	.....	213.835	36,351.95	17.	Mississippi Riv.	
10	Bedford Ramp.....	Madison	.....	Aug. 20, 1907	.....	.....	1,392	236.64	17.	Mississippi Riv.	
11	Lake Palmyra Sec. 1 Ramp	Tensas	.....	Sept. 18, 1907	.....	.....	513	75.66	14.75	Mississippi Riv.	
12	Hard Times Enlargem't	Tensas	Jan. 2, 1906	Jan. 17, 1908	.....	3,500	47,132	7,373.78	{ 14. { 19.	Mississippi Riv.	
13	Cottage Home.....	Tensas	July 4, 1905	Dec. 12, 1907	.....	15,542	172,781	30,582.23	17.7	Mississippi Riv.	
14	Kempe Repair.....	Tensas	.....	Dec. 12, 1907	.....	.....	3,422	958.16	28.	Mississippi Riv.	
15	L'Argent	Tensas & Concordia	Mar. 25, 1907	Sept. 12, 1907	5,376	.....	197,728	35,096.72	17¾	Mississippi Riv.	
16	Sycamore Emergency...	Concordia	.....	Feb. 26, 1907	2,007	.....	25,055	4,572.53	18.25	Mississippi Riv.	
17	Sycamore	Concordia	.....	Sept. 6, 1907	11,283	.....	280.209	51,138.14	18¼	Mississippi Riv.	
	Totals	.....	.....	.....	29,281	47,762	1,391,463	$286,866.59	.....	.....	
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, '08				.....	7,752	136,500	29,977.00	.....	.....	
	Work done from April 20, 1906, to April 20, '08..		.....		29,281 or 5.54 miles	40,010 or 7.57 miles	1,254,963	$256,889.59	.....	.....	{ Average price per cu. yd. 20.48 cts.

Levee work undertaken by the Board of Commissioners of the Tensas Basin Levee District, under five contracts entered into from April 20, 1906, to April 20, 1908, with two contracts of earlier date not completed April 20, 1906.

Number	Name of Contract	County	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost	Price—Cents	Stream	Remarks
1	Chicot Front.....	Desha Co., Ark.	Sept. 19, 1906	.....	4,900	.....	275,000	$ 66,000.00	24.	Mississippi Riv.	Includes $2,530.26 paid for drain ditch.
2	Chicot Front Extension	Desha Co., Ark.	May 11, 1907	.....	4,500	.....	170,000	31,280.00	18.4	Mississippi Riv.	
3	Chicot Front to Arkansas City.....	Desha Co., Ark.	May 11, 1907	.....	.....	11,500	110,000	30,250.00	27.5	Mississippi Riv	
4	Vancluse North.....	Chicot Co., Ark.	Nov. 9, 1907	.....	.....	13,200	115,000	37,605.00	32.7	Mississippi Riv.	
5	Vancluse to Sunny Side	Chicot Co., Ark.	June 30, 1905	Dec. 1, 1906	.....	28,800	138,454	33,090.50	23.9	Mississippi Riv	
6	Lake Port to Brooks Mill	Chicot Co., Ark.	June 30, 1905	Dec. 3, 1906	.....	25,000	115,755	24,192.79	20.9	Mississippi Riv	
7	Sandy Bayou Dyke and Cypress Slough Dyke	Caldwell Par. La.			810	.....	16,200	3,200.00	24¾	Ouachita.	Total cost $4,009.50; $809.50 to be paid by Police Jury.
	Totals	.....	.....	.....	10,210	78,500	940,409	$225,618.29	.....	.....	.....
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, '08				3,384	43,808	511,512	131,976.17	.....	.....	.....
	Work done from April 20, 1906, to April 20, 1908			.....	6,826 or 1.29 miles	34,692 or 6.57 miles	428,897	$ 93,642.12	.....	.....	Average price per cu. yd. 21.83 cts.
	The above is divided by streams as follows:										
			On Mississippi	River	1.20 mi.	6.57 mi.	419,297	$ 91,266.12		.....	
			On Ouachita	River	.09 mi.		9,600	2,376.00			
			Totals	.....	1.29 mi.	6.57 mi.	428,897	93,642.12			

Levee work undertaken by the Board of Commissioners of the Pontchartrain Levee District, under five contracts entered into from April 20, 1906, to April 20, 1908, with one contract of earlier date not completed April 20, 1906.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Victoria	St. Charles...	Oct. 6, 1905	.....	.....	6,336	54,300	$ 11,620.20	21.40	Mississippi Riv.	
2	Ormond Enlargement..	St. Charles...	Oct. 3, 1906	July 27, 1907	550	3,892	31,979	4,796.85	15.	Mississippi Riv.	
3	Albert Spies.....	Jefferson	Sept. 15, 1906	.....	2,764	.....	104,800	24,104.00	23.	Mississippi Riv.	
4	Albert Spies Banquette	Jefferson	.....	.....	.....	3,200	5,190	1,557.00	30.	Mississippi Riv.	
5	Shrewsbury to Parish Line Revetment.....	Jefferson	July 17, 1906	Mar. 9, 1908	440	6,769	54,536	11,452.56	21.	Mississippi Riv.	
6	Shrewsbury to Parish Line	Jefferson	Sept. 18, 1906	Mar. 9, 1908	.....	.....	.....	2,884.79	.....	Mississippi Riv.	84,847 ft. B. M.
	Totals	.....	.....	.....	3,754	20,197	250,805	$ 56,415.40	.....	.....	
	Less work done previous to Apr. 20, '06 and not comp'd Apr. 20, '08				.....	750	4,300	1,032.00	.....	.....	
	Work done from April 20 1906, to April 20, 1908..		.....	.....	3,754 or 0.71 miles	19,447 or 3.68 miles	246,505	$ 55,383.40	.....	.....	{ Average price per cu. yd. 21.34 cts.

Levee work undertaken by the Board of Commissioners of the Lafourche Basin Levee District, under eleven contracts entered into from April 20, 1906, to April 20, 1908, with one contract of earlier date not completed April 20, 1906.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Donaldsonville to Company Canal		June 5, 1906	.....	.....	.....	.....	.....	Scale	Mississippi Riv.	
	Donaldsonville Front	Ascension	.....	.....	3,860	.....	114,359	$ 27,164.09	.....		
	Dugas-Landry	Ascension	.....	.....	1,035	2,585	54,232	12,394.92	.....		
	Magnolia to Parish Line	St. James....	.....	.....	.....	10,390	59,938	10,442.24	.....		
	Flagtown to Ashton.	St. Charles....	.....	.....	1,815	7,055	85,468	17,448.85	.....		
	Nine Mile Point.....	Jefferson	.....	.....	.....	7,535	24,805	3,930.68	.....		
2	A. Bend.....	Ascension	Dec. 17, 1907	.....	2,545	.....	102,700	31,837.00	31.	Mississippi Riv.	
3	Acadia	St. James.....	Nov. 6, 1907	Mar. 11, 1908	2,015	.....	61,361	19,021.91	31.	Mississippi Riv.	
4	St. James Estate.....	St. James.....	March 6, 1906	Aug. 21, 1906	.....	1,660	10,761	2,152.20	20.	Mississippi Riv.	
5	Rich Bend.....	St. James.....	Nov. 6, 1907	.....	2,315	.....	95,000	29,450.00	31.	Mississippi Riv.	
6	Brou	St. John.....	.....	Feb. 14, 1908	888	.....	14,448	2,889.60	20.	Mississippi Riv.	
7	Concession	Plaquemines ..	Aug. 6, 1907	.....	4,625	.....	15,200	3,344.00	22.	Mississippi Riv.	
8	Live Oak.....	Plaquemines ..	June 4, 1907	Jan. 7, 1908	2,755	1,925	68,029	20,408.70	30.	Mississippi Riv.	
9	Jesuit Bend.....	Plaquemines ..	June 4, 1907	Feb. 21, 1908	3,475	.....	63,141	18,942.30	30.	Mississippi Riv.	
10	Star	Plaquemines ..	Aug. 8, 1906	Nov. 6, 1906	417	10,950	45,478	10,232.55	22.5	Mississippi Riv.	
11	Star-Alliance	Plaquemines ..	.....	Feb. 4, 1908	.....	4,105	4,581	1,007.82	22.	Mississippi Riv.	
12	La Reussite-Alliance...	Plaquemines ..	June 4, 1907	.....	2,195	.....	34,500	10,350.00	30.	Mississippi Riv.	
	Totals	.....	.....	.....	27,940	46,205	854,001	$221,016.86	.....	.....	
	Less work done previous to Apr. 20, '06, not completed Apr. 20, '08.				7,612	9,935	282,498	80,434.13	.....	.....	
	Work done from April 20 1906, to April 20, 1908..		....		20,328 or 3.85 miles	36,270 or 6.87 miles	571,503	$140,582.73	.....	.....	Average price per cu. yd. 24.60 cts.

APPENDIX A. STATEMENT No. 7. GRAND PRAIRIE LEVEE DISTRICT.

Amount contributed by the Board of Commissioners of the Grand Prairie Levee District, towards the construction of levee work named under one State contract entered into from April 20, 1906, to April 20, 1908.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		Cubic Yards	Cost	Price—Cents	Stream	REMARKS
			Contract	Final Certificate	New Levee	Enlargement					
1	Baptiste Collette Canal	Plaquemines	.....	.....	See State	Contract	3,048	$ 1,500.00	.....		Total estimated cu. yds. 35,000; cost $13,300, of which $10,800 to be paid by the State and $1,000 by the Oyster Commission.
	Less work not complet	d April 20, 1908	.....	.....	.....	.....	3,048	1,500.00	.....		

APPENDIX A. STATEMENT No. 8. PLAQUEMINES PARISH, EAST BANK LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Plaquemines Parish East Bank Levee District, under one contract entered into January 6, 1906, and not completed April 20, 1908.

1	Gulf Coast Sec. 1....	Plaquemines ..	Jan. 5, 1906	.....	.....	72,754	231,038	$ 28,533.19	12.35	Gulf Coast.	
	Section 2.....	.....	.....	.....	94,751	.....	760,000	90,060.00	11 85		
	Totals	.....	.....	.....	94,751	72,754	991,038	$118,593.19	.....	.....	
	Less work not complet	d April 20, 1908	.....	.....	63,375	.....	567,643	67,205.70	.....	.....	
	Work done from April	20, 1906, to A	pril 20, 1908	.....	31,376 or 5.94 miles	72,754 or 13.78 miles	423,395	$ 51,387.49	.....	.....	(Average price per (cu. yd. 12.13 cts.

APPENDIX A. STATEMENT No. 9. CADDO LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Caddo Leve District, under three contracts entered into from April 20, 1906, to April 20, 1908.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Thompson	Caddo	Apr. 5, 1907	Aug. 3, 1907	2,074	.....	24,098	$ 3,602.65	14.95	Red River.	
2	Gold Pt. Place to Cash Pt. Place Extn.	Caddo	Apr. 5, 1907	Aug. 27, 1907	2.658	.....	34.516	4,970.30	14.40	Red River.	
3	Cash Pt. Place to Twelve Mile Bayou	Caddo	Mar. 30, 1908	.....	15,420	.....	135,000	15,795.00	11.70	Red River.	
	Totals	.....	.....	.....	20,152	.....	193,614	$ 24,367.95	.....	.....	
	Less work not complete	d April 20, 1908	.....	.....	15,420	.....	135,000	15,795.00	.....	.....	
	Work done from April	20, 1906, to April	20, 1908.	.....	4,732 or 0.89 mile	.....	58,614	$ 8,572.95	.....	.....	Average price per cu. yd. 14.62 cts.

APPENDIX A. STATEMENT No. 10. BOSSIER LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Bossier Levee District, under three contracts entered into from April 20, 1906, to April 20, 1908, with one contract of earlier date not completed April 20, 1906.

1	Gold Point Spur	Bossier	June 1, 1906	June 21, 1906	827	.....	6,227	$ 809.51	13.	Red River.	
2	Curtis	Bossier	Oct. 9, 1907	Jan. 28, 1908	2,459	.....	31,765	4,415.33	13.9	Red River.	
3	Dortch Bend	Bossier	See State Contract		.....	.....	32,787	8,000.00	24.4	Red River.	Total cost $72,412.12, $64,412.12 paid by State.
4	Bear Point	Bossier	Nov. 29, 1905	June 2, 1906	5,000	.....	55,723	10,804.68	19.39	Red River.	
	Totals	.....	.....	.....	8,286	.....	126,502	$ 24,029.52	.....	.....	
	Less work done previous	s to April 20,	1906	.....	3,100	.....	20,000	3,878.00	.....	.....	
	Work done from April	20, 1906, to April	20, 1908.	.....	5,186 or 0.98 mile	.....	106,502	$ 20,151.52	.....	.....	Average price per cu. yd. 18.92 cts.

APPENDIX A. STATEMENT No. 7. GRAND PRAIRIE LEVEE DISTRICT.

Amount contributed by the Board of Commissioners of the Grand Prairie Levee District, towards the construction of levee work named under one State contract entered into from April 20, 1906, to April 20, 1908.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		Cubic Yards	Cost	Price—Cents	Stream	REMARKS
			Contract	Final Certificate	New Levee	Enlargement					
1	Baptiste Collette Canal	Plaquemines	.....	.....	See State	Contract	3,948	$ 1,500.00	.....		Total estimated cu. yds. 35,000; cost $13,300, of which $10,800 to be paid by the State and $1,000 by the Oyster Commission.
	Less work not complet	d April 20, 1908	.....	.....	.....	.....	3,948	1,500.00	.....		

APPENDIX A. STATEMENT No. 8. PLAQUEMINES PARISH, EAST BANK LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Plaquemines Parish East Bank Levee District, under one contract entered into January 6, 1906, and not completed April 20, 1908.

1	Gulf Coast Sec. 1....	Plaquemines ..	Jan. 5, 1906	.....	.....	72,754	231,038	$ 28,533.19	12.35	Gulf Coast.	
	Section 2.....	.....	.....	.....	94,751	.....	760,000	90,060.00	11 85		
	Totals	.....	.....	.....	94,751	72,754	991,038	$118,593.19	.....	.....	
	Less work not complet	d April 20, 1908	.....	.....	63,375	.....	567,643	67,205.70	.....	.....	
	Work done from April	20, 1906, to A	pril 20, 1908	.....	31,376 or 5.94 miles	72,754 or 13.78 miles	423,395	$ 51,387.49	.....	.....	(Average price per (cu. yd. 12.13 cts.

APPENDIX A. STATEMENT No. 9. CADDO LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Caddo Leve District, under three contracts entered into from April 20, 1906, to April 20, 1908.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee.	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Thompson	Caddo	Apr. 5, 1907	Aug. 9, 1907	2,074	.....	24,098	$ 3,602.65	14.95	Red River.	
2	Gold Pt. Place to Cash Pt. Place Extn	Caddo	Apr. 5, 1907	Aug. 27, 1907	2,658	.....	34,516	4,970.30	14.40	Red River.	
3	Cash Pt. Place to Twelve Mile Bayou	Caddo	Mar. 30, 1908	.....	15,420	.....	135,000	15,795.00	11.70	Red River.	
	Totals	.....	.....	.....	20,152	.....	193,614	$ 24,367.95	.....	.....	
	Less work not completed April 20, 1908	.....	.....	.....	15,420	.....	135,000	15,795.00	.....	.....	
	Work done from April 20, 1906, to April 20, 1908.	.....	.....	.....	4,732 or 0.89 mile	.....	58,614	$ 8,572.95	.....	.....	Average price per cu. yd. 14.62 cts.

APPENDIX A. STATEMENT No. 10. BOSSIER LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Bossier Levee District, under three contracts entered into from April 20, 1906, to April 20, 1908, with one contract of earlier date not completed April 20, 1906.

1	Gold Point Spur	Bossier	June 1, 1906	June 21, 1906	827	.....	6,227	$ 809.51	13.	Red River.	
2	Curtis	Bossier	Oct. 9, 1907	Jan. 28, 1908	2,459	.....	31,765	4,415.33	13.9	Red River.	
3	Dortch Bend	Bossier	See State Contract		.....	.....	32,787	8,000.00	24.4	Red River.	Total cost $72,412.12, $64,412.12 paid by State.
4	Bear Point	Bossier	Nov. 29, 1905	June 2, 1906	5,000	.....	55,723	10,804.68	19.39	Red River.	
	Totals	.....	.....	.....	8,286	.....	126,502	$ 24,029.52	.....	.....	
	Less work done previous to April 20, 1906	.....	.....	.....	3,100	.....	20,000	3,878.00	.....	.....	
	Work done from April 20, 1906, to April 20, 1908.	.....	.....	.....	5,186 or 0.98 mile	.....	106,502	$ 20,151.52	.....	.....	Average price per cu. yd. 18.92 cts.

APPENDIX A. STATEMENT No. 11. RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Boeuf Levee District, under one one contract entered into from April 20, 1906, to April 20, 1908, and not completed April 20, 1908.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Bayou Petite Prairie South	St. Lanrdy....	Dec. 4, 1906	.....	19,520	.....	245,000	$ 53,900.00	22.	Atchafal'a Riv.	
	Less work not complet	d April 20, 19	08	.....	7,885	.....	99,881	21,973.82	.....		
	Work done from April	20, 1906 to A	pril 20, 1908..	.....	11,635 or 2.20 miles	.....	145,119	$ 31,926.18	.....	.....	{ Average price per cu. yd. 22 cents.

APPENDIX A. STATEMENT No. 12. RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Boeuf Levee District, under one one contract entered into from April 20, 1906, to April 20, 1908, and not completed April 20, 1908.

					Feet Excavation	Miles Clearing					
1	Swazey Lake to Bayou Courtbleau	St. Landry....	Dec. 3, 1906	.....	97,046	25.56	447,350	$139,221.53	17.98		
	Less work not complet	d April 20, 19	08	.....	71,696	15.50	337,250	96,287.55	.....		{ Includes $58,788 for clearing.
	Work done from April	20, 1906, to A	pril 20, 1908..	.....	25,350 or 4.80 miles	10.06	110,100	$ 42,933.98	.....	.....	

APPENDIX A. STATEMENT No. 13. RED RIVER AND BAYOU DES GLAIZES LEVEE AND DRAINAGE DISTRICT

Levee work undertaken by the Board of Commissioners of the Red River and Bayou des Glaizes Levee and Drainage District, under one contract entered into October 10, 1904, and not completed April 20, 1908.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	LINEAR FT. New Levee	LINEAR FT. Enlargement	Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	David's Ferry South..	Avoyelles	Oct. 10, 1904	.....	111,200	.....	835,000	$122,995.50	14.73		
	Less work done previou	s to Apr. 20, '0	6 and not comp	'd Apr. 0, '08.	67,457	.....	360,318	53,074.84	.....		
	Work done from April	20, 1906, to A	pril 20, 1908..	.....	43,743 or 8.28 miles	.....	474,682	$ 69,920.66	.....	.....	{ Average price per cu. yd. 14.73 cts.

APPENDIX A. STATEMENT No. 14. SALINE LEVEE AND DRAINAGE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Saline Levee and Drainage District, under two contracts entered into from April 20, 1906, to April 20, 1908.

1	Cassandria South.....	Avoyelles	Jan. 31, 1907	Dec. 20, 1907	48,000	.....	340,296	$ 52,405.58	15.40	Red River.	
2	Cassandria South No. 2	Avoyelles	.....	.....	6,100	.....	45,000	9,900.00	22.	Red River.	
	Totals	.....	.....	.....	54,100	.....	385,296	$ 62,305.58	.....	.....	
	Less work not complet	d April 20, 19	08	.....	6,100	.....	45,000	9,900.00	.....	.....	
	Work done from April	20, 1906, to A	pril 20, 1908..	.....	48,000 or 9.09 miles	.....	340,296	$ 52,405.58	.....	.....	{ Average price per cu. yd. 15.4 cts.

Work for improvement of Bayou Lafourche undertaken by the Boards of Commissioners of the Atchafalaya Basin and Lafourche Basin Levee Districts, under two contracts entered into from April 20, 1906, to April 20, 1908.

Number	Name of Contract	Parish	DATE OF Contract	DATE OF Final Certificate	Feet Excavation		Cubic Yards	Cost	Price—Cents	Stream	REMARKS
1	Cancienne Canal	Assumption	Sept. 30, 1907		7,875	.....	200,000	$ 30,000.00	15.		
2	Cancienne Canal "A"	Assumption	Dec. 17, 1907		8,500	.....	245,000	42,630.00	17.4		
	Totals				16,375	.....	445,000	72,630.00	.....		
	Less work not complet	d April 20, 19	08		14,250	.....	400,020	64,965.44	.....		
	Work done from April	20, 1906, to A	pril 20, 1908.		2,125 or 0.40 mile	.....	44,980	$ 7,664.56	.....	.....	{ Average price per cu. yd. 17.04 cts.

The Board of State Engineers is indebted to the Orleans Levee Board for the following statement of work undertaken by the Board of Commissioners, under sixteen contracts entered into from April 20, 1906, to April 20, 1908.

Number	Name of Contract	Parish	Date of Contract	Date of Final Certificates	Linear Feet New Levee	Linear Feet Enlargement	Cubic yards	Price Cents	Cost	Revetment Linear Feet	Pile Bank Protection: Linear Ft. of Piles	Pile Bank Protection: Price per Ft. of Piles, Cents	Feet B. M.	Price per M. Ft. B. M.	Cost of Woodwork	Total Cost
1	Raising and Enlargement East Bank London Ave. Canal..	Orleans	June 8, '06	Sept. 17, '06	....	9,050.	18,804.7	39½	$ 7,427.86	.....	....	...	5,040	$49.00	$ 246.96	$ 7,674.82
2	McLellanville, New Revetment		Sept. 6, '06	Dec. 21, '06	....	.....	.....	.....	.....	2,367	....	...	134,279	35.35	4,746.76	4,746.76
3	Raising and Enlargement of Levees in 3rd Dist.....		Sept. 6, '06	Jan. 17, '07	....	4,767.	9,667.7	39¼	3,794.57	.....	....	...	.....	.....	.....	3,794.57
4	Driving Creosote Piles, 5th District		Sept. 20, '06	Nov. 10, '06	....	.....	.....	.....	.....	....	3,377	9¾	.....	.....	329.25	329.25
5	Placing of Filling on River Front, bet. Canal and Conti Streets		March 1, '07	March 15, '07	....	.....	118 loads	pr ld. 10c	11.80	....	....	...	.....	.....	.....	11.80
6	Couret Place, New Levee....		June 26, '07	March 19, '08	1,693	.....	53,946.3	27¾	15,135.09	....	....	...	.....	.....	.....	15,135.09
7	Seventh to Third St., New Levee		Aug. 30, '07	Not complete	1,500	.....	26,228.0	97½	25,572.30	.....	....	...	.....	.....	.....	25,572.30
8	New Revetment and Enlargement of Levee, Algiers Saw Mill to S. P. Yards.....		Sept. 13, '07	Dec. 21, '07	....	654.	3,608.0	43.	1,551.44	654	....	...	60,787	45.50	2,765.81	4,317.25
9	New Levee, Elmira to Mazant		Aug. 3, '07	Not complete	1,700	.....	73,034.0	41½	61,067.13	.....	....	...	.....	70.00	.....	61,067.13
10	Banquettes, 6th and 7th Dist.		Sept. 3, '07	March 30, '08	....	5,318.	24,803.0	43.	10,665.29	.....	....	...	.....	.....	.....	10,665.29
11	New Revetment. Convent to Huguet		Sept. 13, '07	Jan. 16, '08	....	.....	600.0	25.	150.00	3,508	....	...	180,413	61.75	11,140.50	11,290.50
12	Beka Plantation, New Levee.		Oct. 14, '07	Not complete	....	.....	25,000.0	29.45	7,362.50	.....	....	...	.....	.....	.....	7,362.50
13	Lower Delacroix to Upper Beka Plant., New Levee and Revetment		Oct. 14, '07	Not complete	3,407	.....	25,760.0	23.	5,925.01	700	....	...	35,000	85.00	2,975.00	8,900.01
14	Egania to Andry, New Levee		Oct. 25, '07	Feb. 13, '08	407	.....	5,207.5	82.	4,270.15	.....	....	...	.....	.....	.....	4,270.15
15	Filling behind wharf, St. Andrew to Jackson.....		Nov. 5, '07	Not complete	....	900.	4,000.0	65.	2,600.00	.....	....	...	.....	.....	.....	2,600.00
16	Filling behind wharf, St. Andrew to Celeste.....		Jan. 22, '08	March 6, '08	....	695.5	3,082.5	55.	1,695.37	.....	....	...	.....	.....	.....	1,695.37
	Totals		.....	.....	8,707	21,384.5	273,742.6	.....	$147,228.51	7,229	....	...	415,519	.....	$22,204.28	$169,432.79

Note.—Where contracts are not completed, the estimated amounts earned to date are given. The following contracts reported not finished in last biennial report have been completed as follows:

Number	Name of Contract	Parish	Date of Contract	Date of Final Certificate	Linear Feet New Levee	Linear Feet Enlargement	Cubic yards	Price Cents	Cost	Revetment Linear Feet	Pile Bank Protection Linear Ft. of Piles	Pile Bank Protection Price per Ft. of Piles, Cents	Feet B. M.	Price per M. Ft. B. M.	Cost of Woodwork	Total Cost
	Furnishing of Piles and Caps 3rd District	Orleans	July 18, '05	Aug. 21, '06	....	.....	.....	.....	.....	....	48,742	20c	.....	.....	9,748.40	9,748.40
	Repairs to 3rd Dist. Pile Bank Protection		Oct. 3, '05	Aug. 21, '06	....	.....	.....	.....	.....	....	47,580	11c	107,520	$14.00	6,760.49	6,760.49
	Placing of Filling on Levee		Jan. 26, '06	Sept. 20, '07	....	.....	40,422. loads	pr ld. 10c 30c 40c	$ 11,304.24	.....	.....	...	.....	.....	.....	11,304.24

In addition to above $74,905.29 has been spent in the general repair and maintenance of levees.

W. D. ELAM, Engineer.

DISTRICT	MILES		DISTRICT		REMARKS
	New Levee	Enlargement	Cubic Yards	Cost	
Tensas Basin	1.29	6.57	428,897	$ 93,642.12	
Fifth Louisiana	5.54	7.57	1,254,063	256,389.59	
Atchafalaya Basin	2.15	12.85	1,450,350	321,483.74	
Pontchartrain	0.71	3.68	246,505	55,383.40	
Lafourche Basin	3.85	6.87	571,503	140,582.73	
Orleans	1.65	4.05	273,743	169,432.79	
Lake Borgne Basin	....	....	.....	.....	
Grand Prairie	....	....	.....	.....	
Buras	....	....	.....	.....	
Plaquemines Parish East Bank	5.94	13.78	423,395	51,387.49	
Caddo	0.89	.....	58,614	8,572.95	
Bossier	0.98	.....	106,502	20,151.52	
Red River, Atchafalaya and Bayou Boeuf	2.20	.....	145,119	31,926.18	
Red River and Bayou des Glaizes	8.28	.....	474,682	69,920.66	
Saline	9.09	.....	340,296	52,405.58	
Totals	42.57	55.37	5,774,569	$1,271,278.75	
DRAINAGE	MILES Excavation	MILES Clearing			
Red River, Atchafalaya and Bayou Boeuf Levee District	4.80	10.06	110,100	$ 42,933.98	
IMPROVING BAYOU LAFOURCHE	MILES Excavation	MILES Clearing			
Atchafalaya Basin and Lafourche Basin Levee Districts	0.40	.....	44,980	$ 7,664.56	

APPENDIX A. STATEMENT No. 18. TOTALS AND BALANCES. DISTRICTS AND STATE.

Tabulated statement showing number of cubic yards and cost involved in 28 contracts (District and State) entered into previous to April 20, 1906, and not then completed, with 108 contracts entered into between April 20, 1906, and April 20, 1908, divided into accounts showing work done under all; that is previous to April 20, 1906, between April 20, 1906, and April 20, 1908, and still remaininng to be done under existing contracts, April 20, 1908.

NAME OF DISTRICT	Work Done Previous to April 20, 1906		Work Done from April 20, 1906 to April 20, 1908		Work Remaining to be Done Under Existing Contracts		Total Amounts Involved in Contracts	
	Cubic Yards	Cost	Cubic Yards	Cost	Cubic Yards	Cost	Cubic Yards	Cost
				DISTRICT				
Tensas	80,300	$ 18,921.70	428,897	$ 93,642.12	422,212	$113,054.47	940,409	$ 225,618.29
Fifth Louisiana	63,500	10,777.00	1,254,963	256,389.59	73,000	19,200.00	1,391,463	286,366.59
Atchafalaya	168,276	33,067.08	1,450,350	321,483.74	2,044,659	425,614.34	3,663,285	780,165.16
Pontchartrain	3,000	642.00	246,505	55,383.40	1,300	390.00	250,805	56,415.40
Lafourche	31,823	7,160.18	571,503	140,582.73	250,675	73,273.95	854,001	221,016.86
Orleans	.....	.....	273,743	169,432.79	.....	.....	273,743	169,432.79
Grand Prairie	.....	.....	.....	.....	3,948	1,500.00	3,948	1,500.00
Buras	.....	.....	.....	.....	.....	.....	.....	.....
Plaquemines Parish East Bank	.....	.....	423,395	51,387.49	567,643	67,205.70	991,038	118,593.19
Caddo	.....	.....	58,614	8,572.95	135,000	15,795.00	193,614	24,367.95
Bossier	20,000	3,878.00	106,502	20,151.52	.....	.....	126,502	24,029.52
Saline	.....	.....	340,296	52,405.58	45,000	9,900.00	385,296	62,305.58
Red River and Bayou des Glaizes	332,418	48,965.17	474,682	69,920.66	27,900	4,109.67	835,000	122,995.50
Red River, Atchafalaya and Bayou Boeuf	.....	.....	145,119	31,926.18	99,881	21,973.82	245,000	53,900.00
Totals	708,317	$123,411.13	5,774,569	$1,271,278.75	3,671,218	$752,016.95	10,154,104	$2,146,706.88

				STATE				
Fifth Louisiana	39,202	$ 6,471.79	828,797	$ 149,957.45	432,708	$106,092.50	1,300,707	$ 262,521.74
Atchafalaya	.....	.....	297,851	87,685.00	149,149	35,050.00	447,000	122,735.00
Pontchartrain	166,920	23,285.34	193,041	34,282.82	144,600	26,854.75	504,561	84,422.91
Lafourche	.....	.....	238,216	47,171.18	113,181	25,997.86	351,397	73,169.04
Lake Borgne	16,695	2,859.02	103,818	24,358.14	21,159	4,089.63	141,672	32,206.79
Grand Prairie	22,350	3,501.50	79,672	23,304.14	33,700	13,448.34	135,722	40,253.98
Buras	9,362	2,246.88	82,132	26,389.52	6,012	1,162.31	97,506	29,798.71
Plaquemines Parish East Bank	.....	.....	32,497	6,895.25	.....	.....	32,499	6,895.25
Caddo	72,810	9,130.62	403,665	72,913.15	.....	.....	476,475	82,043.77
Bossier	47,577	6,342.19	381,871	81,326.64	.....	.....	429,448	87,668.83
Red River, Atchafalaya and Bayou Boeuf	93,539	18,660.59	229,030	49,366.06	.....	.....	322,569	68,026.65
Totals	468,455	$ 72,497.93	2,870,590	$ 603,649.35	900,509	213,595.39	4,239,554	889,742.67
				SUMMARY				
Districts	708,317	$123,411.13	5,774,569	$1,271,278.75	3,671,218	$752,016.95	10,154,104	$2,146,706.83
State	468,455	72,497.93	2,870,590	603,649.35	900,509	213,595.39	4,239,554	889,742.67
Totals	1,176,772	$195,909.06	8,645,159	$1,874,928.10	4,571,727	$965,612.34	14,393,658	$3,036,449.50

The Board of State Engineers is indebted to the courtesy of Captain Clarke S. Smith, Corps of Engineers United States Army, for the following statements of levees built and enlarged and revetment built and maintained for levee protection by the United States in the Upper Tensas District in Arkansas and Louisiana, from April 20, 1906, to April 20, 1908.

LEVEES.

Name of Contract	Parish	DATE OF		LINEAR FEET		Cubic Yards	Cost	Total Cost	Price	Stream	REMARKS
		Contract	Final Certificate	New Levee	Enlargement						
In Arkansas											
Stas. 635-662	Desha Co.	Aug. 20, '07	.....	2,700	.....	66,076	$ 15,197.48	.....	23.	Arkansas Riv.	Not Completed
" 662-697	Desha Co.	Aug. 20, '07	.....	3,500	.....	43,663	8,295.97	.....	19.	Arkansas Riv.	Not Completed
" 620-650	Desha Co.	Sept. 24, '06	Jan. 24, '08	3,000	.....	129,801	31,152.24	.....	24.	Mississippi Riv.	
" 1625-1720	Chicot Co.	July 11, '05	June 22, '06	.....	9,500	13,890	3,875.30	.....	27.9	Mississippi Riv.	
" 1710-1740	Chicot Co.	May 25, '07	Nov. 5, '07	3,000	.....	143,894	37,268.55	.....	25.9	Mississippi Riv.	
" 1720-1750	Chicot Co.	Oct. 25, '06	.....	.....	5,000	43,445	14,858.19	.....	34.2	Mississippi Riv.	Not Completed
" 1790-1854	Chicot Co.	June 1, '07	.....	.....	6,400	47,803	11,902.95	.....	24.9	Mississippi Riv.	Not Completed
Leland Dike 60-90	Chicot Co.	May 27, '07	Dec. 2, '07	3,000	.....	96,835	23,918.24	.....	24.7	Mississippi Riv.	
Stas. 2850-3100	Chicot Co.	July 10, '05	Oct. 2, '07	.....	25,000	15,165	2,957.18	.....	19.5	Mississippi Riv.	
" 3671-3762a	Chicot Co.	Sept. 24, '06	Nov. 19, '07	9,100	.....	256,233	48,428.04	.....	18.9	Mississippi Riv.	
" 3671-3762a	Chicot Co.	Sept. 24, '06	Nov. 19, '07	1,200	.....	33,863	7,788.49	.....	23.0	Mississippi Riv.	Protected
Totals in Arkansas	.....	.....	.....	25,500	45,900	890,668	$205,642.63	$205,642.63	.....		
In Louisiana											
Stas. 3073-3054a	Madison	Sept. 20, '06	Feb. 12, '07	1,700	.....	55,187	$ 13,195.22	$ 13,195.22	23.91		

REVETMENT.

Name of Revetment	Parish	Total Length		Expended During Period		
		Proposed Feet	Constructed Feet	For New Revetment	For Repairs	
Lake Providence	E. Carroll.	12,600	12,600	.....	$ 62,811.69	.....
Reed-Bedford	Madison ..	*6,000	†2,200	$107,465.21	.....	$170,276.90
	Grand Total					$389,114.75

*Approximate. †Not completed.

APPENDIX A. STATEMENT No. 20. UNITED STATES LEVEES.

The Board of State Engineers is indebted to the courtesy of Major J. F. McIndoe, Corps of Engineers, U. S. A., for the following statement of levees built and enlarged by the United States in the Fourth District, improving Mississippi River from opposite Warrenton, Miss., to head of Passes, from April 20, 1906, to April 20, 1908.

LOWER TENSAS DISTRICT.

Name of Contract	Miles below Cairo		DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost
Ashland—								
Section 1	738.	R	June 21, '07	July 17, '07	.....	1,600	11,599.08	$ 2,314.02
" 2	"		June 21, '07	July 31, '07	.....	1,743	12,493.71	2,524.50
Bougere, Lot 9								
Section 1	738.5	R	Sept. 14, '06	Nov. 12, '06	400.	800	12,545.49	4,133.78
" 2	"		Sept. 14, '06	Oct. 9, '06	300.	.....	15,240.19	5,021.65
" 3	"			Nov. 30, '06	300.	.....	14,462.12	4,765.27
Bougere, Lot 2								
Section 4	739.	R	Aug. 30, '05	Jan. 8, '07	500.	.....	22,169.40	5,985.73
" 5	"		Aug. 30, '05	Nov. 19, '06	400.	.....	18,877.11	5,096.82
" 6	"		Aug. 30, '05	Dec. 5, '06	400.	.....	18,189.43	4,911.14
" 7	"		Aug. 30, '05	Nov. 26, '06	400.	.....	24,099.86	6,506.96
" 8	"		Aug. 30, '05	Nov. 1, '07	400.	.....	22,283.66	6,016.59
Bougere, Lot 10								
Section 1	739.5	R	Oct. 17, '06	Sept. 10, '07	200.	.....	9,099.65	2,948.28
" 2	"		Oct 17, '06	Oct. 11, '07	300.	.....	13,462.03	4,361.70
" 3	"		Oct. 17, '06	Oct. 11, '07	200.	.....	9,131.59	2,958.64
" 4	"		Oct. 17, '06	Oct. 11, '07	300.	.....	12,480.67	4,043.73
" 5	"		Oct. 17, '06	Nov. 26, '07	300.	.....	13,282.81	4,303.63
" 6	"		Oct. 17, '06	Dec. 16, '07	200.	.....	8,779.89	2,844.68
" 7	"		Oct. 17, '06	Dec. 9, '07	344.5	.....	19,062.86	6,176.37
" 8	"		Oct. 17, '06	Dec. 18, '07	400.	.....	21,324.93	6,909.28
Bougere, Lot 11								
Section 1	739.5	R	June 21, '07	Jan. 30, '08	200.	.....	9,715.05	3,592.62
Bougere, Lot B								
Section 1	739.5	R	Aug. 29, '06	Oct. 22, '07	200.	.....	14,689.06	5,361.51
" 2	"		Aug. 29, '06	Nov. 14, '07	200.	.....	14,074.06	5,137.03
" 3	"		Aug. 29, '06	Dec. 11, '07	200.	.....	13,845.00	5,053.42
" 4	"		Aug. 29, '06	Jan. 9, '08	200.	.....	13,673.50	4,990.83
" 5	"		Aug. 29, '06	Feb. 1, '08	200.	.....	13,287.63	4,849.99
Bougere, Lot 14								
Section 7	739.5	R	Aug. 29, '06	Dec. 19, '07	200.	.....	11,493.78	4,195.23
Bougere, Lot 3								
Section 4	"		Aug. 30, '05	Dec. 18, '07	300.	.....	16,345.55	5,448.52
" 5	"		Aug. 30, '05	Nov. 14, '07	400.	.....	16,719.08	5,573.02
" 6	"		Aug. 30, '05	Jan. 24, '08	200.	.....	10,673.82	3,557.94
" 7	"		Aug. 30, '05	Oct 25, '06	300.	.....	17,248.54	5,749.51
" 8	"		Aug. 30, '05	Dec. 25, '06	400.	.....	22,091.13	7,363.71
Bougere, Lot 4								
Section 1	740.5	R	Aug. 30, '05	Oct. 16, '07	300.	.....	16,622.59	5,540.86
" 2	"		Aug. 30, '05	Jan. 14, '08	300.	.....	17,851.87	5,950.62
" 3	"		Aug. 30, '05	Nov. 14, '07	200.	.....	11,405.72	3,801.90
" 4	"		Aug. 30, '05	Oct. 16, '07	300.	.....	17,504.84	5,834.95
" 5	"		Aug. 30, '05	Jan. 3, '07	300.	.....	17,873.63	5,957.88
" 6	"		Aug. 30, '05	Nov. 7, '06	300.	.....	17,561.27	5,853.76
" 7	"		Aug. 30, '05	Dec. 11, '07	300.	.....	18,328.47	6,109.49
Bougere, Lot 5								
Section 1	741.	R	Aug. 30, '05	Nov. 21, '07	300.	.....	18,497.37	6,196.62
" 2	"		Aug. 30, '05	Oct. 21, '07	300.	.....	18,731.75	6,275.14
" 3	"		Aug. 30, '05	Sept. 26, '07	300.	.....	19,344.90	6,480.54
" 4	"		Aug. 30, '05	Jan. 21, '07	300.	.....	18,690.50	6,261.32
" 5	"		Aug. 30, '05	Dec. 11, '06	200.	.....	12,791.60	4,285.18
" 6	"		Aug. 30, '05	Oct. 23, '06	300.	.....	19,375.20	6,490.69
" 7	"		Aug. 30, '05	Sept. 18, '06	200.	.....	12,913.19	4,325.92
" 8	"		Aug. 30, '05	Sept. 18, '06	300.	.....	18,823.56	6,305.89

APPENDIX A. STATEMENT No. 20.—Continued.

Name of Contract	Miles below Cairo	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost
Bougere, Lot 6...	741.5 R	Aug. 30, '05	Nov. 6, '06	200.	.....	12,894.99	4,427.28
Section 1.....	"	Aug. 30, '05	Dec. 11, '06	300.	.....	18,698.89	6,419.95
" 2.....	"	Aug. 30, '05	Jan. 12, '07	200.	.....	12,669.94	4,350.01
" 3.....	"	Aug. 30, '05	Jan. 15, '08	200.	.....	13,326.20	4,575.33
" 4.....	"	Aug. 30, '05	Dec. 20, '06	300.	.....	19,862.59	6,819.49
" 5.....	"	Aug. 30, '05	Nov. 21, '06	300.	.....	18,838.46	6,467.87
" 6.....	"	Aug. 30, '05	Oct. 26, '06	300.	.....	17,887.89	6,141.51
" 7.....	"	Aug. 30, '05	Sept. 24, '06	300.	.....	16,849.18	5,784.88
Bougere, Lot 7...	742. R	Aug. 30, '05	Sept. 13, '06	300.	.....	17,099.90	4,702.47
Section 1.....	"	Aug. 30, '05	Sept. 18, '06	300.	.....	16,770.91	4,612.00
" 2.....	"	Aug. 30, '05	Oct. 30, '06	300.	.....	16,802.36	4,620.65
" 3.....	"	Aug. 30, '05	Dec. 26, '06	300.	.....	16,676.52	4,586.04
" 4.....	"	Aug. 30, '05	Dec. 26, '06	300.	.....	15,995.55	4,398.78
" 5.....	"	Aug. 30, '05	Oct. 30, '06	300.	.....	14,674.35	4,035.45
" 6.....	"	Aug. 30, '05	Sept. 18, '06	300.	.....	14,885.44	4,093.49
" 7.....	"	Aug. 30, '05	Sept. 13, '06	300.	.....	14,994.42	4,123.47
" 8.....	"	Aug. 30, '05	Dec. 20, '06	300.	.....	14,728.13	2,798.35
Bougere, Lot 8...	742.5	Aug. 30, '05	Aug. 19, '07	300.	.....	14,320.04	2,720.81
Section 1.....	"	Aug. 30, '05	Jan. 1, '07	400.	.....	14,718.22	2,796.46
" 2.....	"	Aug. 30, '05	Aug. 27, '06	500.	.....	14,553.58	2,765.18
" 3.....	"	Aug. 30, '05	Aug. 15, '06	600.	.....	14,120.34	2,682.86
" 4.....	"	Aug. 30, '05	July 6, '06	900.	.....	15,397.19	2,925.46
" 5.....	"	Aug. 30, '05	.....	20,044.5	4,143	1,055,432.23	$325,214.80
" 6.....	"	.....	.....				
Totals	.....	.....	.....				

ATCHAFALAYA DISTRICT

Torras—							
Section 1.....	765. R	Dec. 20, '06	Nov. 2, '07	600.	.....	12,612.70	$ 1,854.06
" 2.....	"	Dec. 20, '06	Sept. 21, '07	600.	.....	12,061.41	1,773.03
" 3.....	"	Dec. 20, '06	Jan. 27, '08	500.	.....	11,564.53	1,698.53
" 4.....	"	Dec. 20, '06	Jan. 10, '08	500.	.....	13,578.23	1,996.00
" 5.....	"	Dec. 20, '06	Sept. 25, '07	500.	.....	12,823.20	1,885.01
" 6.....	"	Dec. 20, '06	Nov. 2, '07	511.	.....	13,290.81	1,953.75
New Texas—							
Section 1.....	785. R	Dec. 31, '07	Mar. 17, '08	200.	.....	11,725.98	2,696.98
Plaquemine—							
Section 1.....	796. R	Jan. 26, '06	July 6, '06	400.	.....	14,907.67	2,813.82
" 2.....	"	Jan. 26, '06	May 16, '06	500.	.....	21,437.58	4,046.34
" 3.....	"	Jan. 26, '06	May 26, '06	400.	.....	17,906.46	3,379.85
" 4.....	"	Jan. 26, '06	June 20, '06	300.	.....	14,288.05	2,696.87
" 5.....	"	Jan. 26, '06	June 20, '06	300.	.....	14,081.01	2,657.79
" 6.....	"	Jan. 26, '06	June 26, '06	300.	.....	13,887.35	2,621.24
" 7.....	"	Jan. 26, '06	June 26, '06	300.	.....	14,341.80	2,707.02
" 8.....	"	Jan. 26, '06	June 26, '06	300.	.....	14,211.09	2,682.34
" 9.....	"	Jan. 26, '06	Aug. 9, '06	300.	.....	14,420.64	2,721.90
" 10.....	"	Jan. 26, '06	Aug. 9, '06	300.	.....	14,166.81	2,673.99
" 11.....	"	Jan. 26, '06	Aug. 13, '06	300.	.....	13,668.74	2,579.97
" 12.....	"	Jan. 26, '06	Aug. 13, '06	300.	.....	13,685.32	2,583.10
" 13.....	"	Jan. 26, '06	Sept. 7, '06	300.	.....	12,986.35	2,451.17
" 14.....	"	Jan. 26, '06	Sept. 7, '06	300.	.....	12,823.08	2,420.36
" 15.....	"	Jan. 26, '06	Sept. 7, '06	400.	.....	16,111.80	3,041.10
" 16.....	"	Jan. 26, '06	Aug. 13, '06	385.	.....	18,435.26	3,479.66
Arbroth—							
Section 1.....	813. R	Jan. 26, '06	June 14, '06	350.	.....	14,096.46	2,449.26
" 2.....	"	Jan. 26, '06	May 4, 06	500.	.....	17,271.11	3,000.87
" 3.....	"	Jan. 26, '06	May 4, 06	500.	.....	16,663.49	2,895.29
" 4.....	"	Jan. 26, '06	May 4, 06	400.	.....	13,805.81	2,398.76
" 5.....	"	Jan. 26, '06	May 26, '06	400.	.....	14,152.31	2,458.96
" 6.....	"	Jan. 26, '06	June 1, '06	500.	.....	17,681.88	3,072.22
" 7.....	"	Jan. 26 '06	June 14, '06	400.	.....	14,739.90	2,561.06
" 8.....	"	Jan. 26, '06	June 14, '06	400.	.....	15,533.05	2,698.67
" 9.....	"	Jan. 26, '06	June 14, '06	400.	.....	13,436.90	2,334.66
" 10.....	"	Jan. 26, '06	June 14, '06	413.	.....	12,749.25	2,215.18
Totals	.....	.....	.....	13,058.	.....	479,146.03	$ 85,498.81

APPENDIX A. STATEMENT No. 20.—Continued.

PONTCHARTRAIN DISTRICT.

Name of Contract	Miles below Cairo		DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost
Gomez	855.	L	Oct. 1, '06	Jan. 20, '08	.....	3,076	19,456.83	$ 3,502.23
St. Gabriel—								
Section 1	862.	L	July 22, '07	Mar. 12, '08	.....	2,270	11,457.78	2,176.98
" 4	"		July 22, '07	Feb. 4, '08	.....	1,800	11,261.07	2,139.60
" 5	"		July 22, '07	Feb. 26, '08	.....	2,400	11,383.88	2,162.94
Margaret—								
Section 1	863.	L	Aug. 28, '05	Jan. 5, '07	.....	1,248	11,674.60	1,926.32
" 2	"		Aug. 28, '05	Dec. 15, '06	.....	1,300	11,785.10	1,944.55
" 3	"		Aug. 28, '05	Jan. 7, '07	.....	1,098	11,336.85	1,870.60
" 4	"		Aug. 28, '05	Sept. 13, '07	.....	900	12,212.63	2,015.08
" 5	"		Aug. 28, '05	Oct. 5, '07	.....	892	11,289.41	1,862.75
Dreyfous—								
Section 1	874.	L	July 22, '07	Nov. 25, '07	379.	.....	12,387.36	2,415.53
" 2	"		July 22, '07	Nov. 7, '07	300.	.....	11,166.83	2,177.54
" 3	"		July 22, '07	Jan. 21, '08	400.	.....	14,835.02	2,892.83
" 4	"		July 22, '07	Feb. 4, '08	370.	.....	12,061.90	2,352.07
Dreyfous Lower—								
Section 4	874.	L	Dec. 16, '07	Mar. 20, '08	300.	.....	11,515.63	2,216.77
Cottage Farm—								
Section 1	878.	L	Aug. 28, '05	June 25, '06	.....	1,400	12,736.85	2,101.58
" 2	"		Aug. 28, '05	July 3, '06	.....	1,400	12,584.70	2,076.48
" 3	"		Aug. 28, '05	Sept. 6, '06	.....	1,100	11,922.85	1,967.27
" 4	"		Aug. 28, '05	Aug. 14, '06	.....	1,200	13,434.40	2,216.68
" 5	"		Aug. 28, '05	Sept. 6, '06	.....	1,500	15,040.14	2,481.62
" 6	"		Aug. 28, '05	Sept. 6, '06	.....	1,400	12,837.59	2,118.20
Bell Helene—								
Section 1	879.	L	Aug. 28, '05	Sept. 12, '06	.....	1,300	12,396.18	2,045.37
" 2	"		Aug. 28, '05	Sept. 26, '06	.....	1,500	13,479.29	2,224.08
" 3	"		Aug. 28, '05	Oct. 2, '06	.....	1,200	12,370.47	2,041.13
" 4	"		Aug. 28, '05	Nov. 13, '06	.....	1,100	13,391.79	2,209.65
" 5	"		Aug. 28, '05	Nov. 13, '06	.....	900	13,045.08	2,152.44
" 6	"		Aug. 28, '05	Nov. 13, '06	.....	1,025	13,143.82	2,167.73
Gem—								
Section 1	882.	L	July 22, '07	Feb. 7, '08	220.	.....	9,487.32	2,058.75
" 2	"		July 22, '07	Feb. 7, '08	200.	.....	9,714.79	2,108.11
" 3	"		July 22, '07	Feb. 7, '08	300.	.....	14,244.12	3,090.97
" 4	"		July 22, '07	Jan. 6, '08	300.	.....	14,315.21	3,106.40
" 5	"		July 22, '07	Jan. 6, '08	200.	.....	9,488.90	2,059.09
" 6	"		July 22, '07	Jan. 6, '08	200.	.....	9,340.51	2,026.89
" 7	"		July 22, '07	Nov. 12, '07	200.	.....	9,325.83	2,023.70
" 8	"		July 22, '07	Nov. 12, '07	300.	.....	13,871.79	3,010.18
" 9	"		July 22, '07	Nov. 12, '07	264.	.....	10,294.09	2,233.82
Hermitage—								
Section 1	887.	L	Aug. 28, '05	Aug. 30, '07	.....	1,305	11,752.68	1,939.19
" 2	"		Aug. 28, '05	Sept. 16, '07	.....	1,400	11,520.39	1,902.35
" 3	"		Aug. 28, '05	Sept. 16, '07	.....	1,300	11,401.37	1,881.23
Burnside	891.	L	Oct. 1, '06	Feb. 21, '08	.....	2,152	18,644.18	3,052.98
Union—								
Section 3	894.	L	Oct. 1, '06	Aug. 31, '07	500.	.....	13,040.86	$ 2,005.03
" 4	"		Oct. 1, '06	Oct. 1, '07	600.	.....	13,980.96	2,149.57
" 5	"		Oct. 1, '06	Oct. 1, '07	.....	748	13,038.42	2,004.66
" 6	"		Oct 1, '06	Feb. 10, '08	.....	1,500	13,019.79	2,001.79
" 7	"		Oct. 1, '06	Mar. 5, '08	.....	1,500	13,112.93	2,016.01
Bourbon—								
Section 1	910.	L	Aug. 28, '05	Aug. 16, '07	.....	1,200	12,391.94	2,044.67
" 2	"		Aug. 28, '05	Aug. 3, '07	.....	1,200	12,507.83	2,063.79
" 3	"		Aug. 28, '05	Jan. 17, '07	.....	1,300	12,192.79	2,011.81
" 4	"		Aug. 28, '05	Dec. 21, '06	.....	1,400	11,437.06	1,887.11
" 5	"		Aug. 28, '05	Dec. 12, '06	.....	1,495	11,760.19	1,940.44
Lutcher—								
Section 3	915.	L	Aug. 28, '05	Dec. 4, '06	.....	850	6,137.67	1,012.72
Prospect—								
Section 1	934.	L	July 22, '07	Feb. 7, '08	.....	2,065	15,261.22	2,823.33
" 2	"		July 22, '07	Mar. 5, '08	.....	2,000	14,485.84	2,679.88
" 3	"		July 22, '07	Mar. 5, '08	.....	2,200	14,762.76	2,731.11

APPENDIX A. STATEMENT No. 20.—Continued.

Name of Contract	Miles below Cairo		DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost
Sarpy—								
Section 1.....	936.	L	Oct. 1, '07	Feb. 27, '08	.....	1,435	13,723.38	5,352.12
" 2.....	"		Oct. 1, '07	Mar. 7, '08	.....	1,395	13,056.06	5,091.86
Pecan Grove—								
Section 1.....	941.	L	Oct. 1, '06	Mar. 4, '08	.....	2,200	13,354.45	2,001.74
" 2.....	"		Oct. 1, '06	Mar. 4, '08	.....	2,100	14,056.19	2,107.02
" 3.....	"		Oct. 1, '06	Feb. 24, '08	708.	92	13,420.28	2,011.70
" 4.....	"		Oct. 1, '06	Feb. 24, '08	800.	.....	12,529.75	1,878.21
" 5.....	"		Oct. 1, '06	Feb. 14, '08	330.	1,362	12,934.12	1,938.82
" 6.....	"		Oct. 1, '06	Feb. 4, '08	.....	2,210	12,079.49	1,810.72
Totals	.....		.....	.....	6,880.	63,018	765,902.40	$113.514.80

LAFOURCHE DISTRICT

Waguespack—								
Section 4.....	914.	R	Jan. 10, '06	Aug. 11, '06	.....	2,958	18,978.43	$ 2,271.72
Columbia—								
Section 1.....	923.	R	Jan. 10, '06	Nov. 4, '07	.....	1,660	11,736.16	1,613.72
" 2.....	"		Jan. 10, '06	Nov. 4, '07	.....	2,000	11,887.17	1,634.49
" 3.....	"		Jan. 10, '06	Nov. 4, '07	.....	2,300	12,456.70	1,712.81
" 4.....	"		Jan. 10, '06	Nov. 4, '07	.....	1,800	12,011.38	1,651.56
" 5.....	924.	R	Jan. 10, '06	Oct. 23, '07	.....	2,300	12,296.87	1,690.82
" 6.....	"		Jan. 10, '06	Oct. 23, '07	.....	2,800	13,572.25	1,866.18
Waterford—								
Section 1.....	932.	R	Jan. 10, '06	Nov. 28, '07	.....	2,418	12,268.29	1,402.27
" 2.....	"		Jan. 10, '06	Dec. 7, '07	.....	2,400	13,037.34	1,490.17
" 3.....	"		Jan. 10, '06	Dec. 13, '07	.....	2,700	12,432.45	1,421.03
" 4.....	933.	R	Jan. 10, '06	Dec. 20, '07	.....	2,300	11,699.55	1,337.26
" 5.....	"		Jan. 10, '06	Dec. 28, '07	500.	.....	11,271.72	1,288.36
" 6.....	"		Jan. 10, '06	Jan. 5, '08	568.	.....	12,579.46	1,437.83
" 7.....	"		Jan. 10, '06	Jan. 11, '08	300.	2,500	17,431.49	1,992.42
" 8.....	"		Jan. 10, '06	Jan. 23, '08	.....	3,010	15,145.76	1,731.17
Willswood—								
Section 1.....	951.	R	Jan. 10, '06	Mar. 14, '08	.....	2,910	12,661.93	2,089.22
" 2.....	"		Jan. 10, '06	Nov. 12, '07	.....	3,333	13,037.34	2,151.16
Oakville—								
Section 1.....	988.	R	Sept. 19, '05	Jan. 10, '08	.....	3,468	13,811.33	2,403.17
" 2.....	989.	R	Sept. 19, '05	Feb. 10, '08	.....	3,300	14,190.99	2,469.23
" 4.....	990.	R	Sept. 19, '05	Nov. 9, '07	.....	2,400	13,380.07	2,328.14
" 5.....	991.	R	Sept. 19, '05	Oct. 8, '06	.....	2,345	12,575.73	2,184.00
Magnolia—								
Section 1.....	1011.	R	Sept. 19, '05	Feb. 27, '08	.....	4,270	11,933.86	2,112.30
" 4.....	1013.	R	Sept. 19, '05	Jan. 20, '08	.....	2,200	12,218.39	2,162.65
" 5.....	1014.	R	Sept. 19, '05	Nov. 14, '06	.....	2,853	13,282.07	2,024.48
Socola—								
Section 1.....	1015.	R	Aug. 27, '06	Nov. 15, '07	518.	1,050	10,400.84	1,710.94
" 2.....	"		Aug. 27, '06	Oct. 29, '07	728.	.....	9,163.57	1,507.41
" 3.....	"		Aug. 27, '06	Aug. 30, '07	744.	.....	9,415.59	1,586.15
Socola Dam.....	1015.	R	Built by day force	Dec. 20, '07	439.	.....	5,271.21	1,823.03
Totals	.....		.....	.....	3,797.	59,275	350,148.03	$ 51,093.69
Socola Concrete Re	vetment		.....	.....	.....	.....	.....	2,828.00
					.....	.....	.....	$ 53,921.69

613184

STATEMENT No. 20.—Continued.

LAKE BORGNE DISTRICT.

Name of Contract	Miles below Cairo	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement	Cubic Yards	Cost
Woodlawn—							
Section 1.....	991. L	Dec. 27, '06	Mar. 4, '08	.....	2,662	11,167.47	$ 2,456.84
" 2.....	992. L	Dec. 27, '06	Jan. 25, '08	.....	2,768	11,503.95	2,530.87
" 3.....	993. L	Dec. 27, '06	Nov. 14, 07	400.	2,286	10,356.59	2,278.45
Fairview—							
Section 1.....	996. L	Dec. 27, '06	Mar. 4, '08	.....	3,510	12,233.05	2,568.94
" 2.....	997. L	Dec. 27, '06	Feb. 27, '08	.....	3,900	10,858.03	2,280.19
" 3.....	"	Dec. 27, '06	Jan. 23, '08	.....	2,400	10,741.16	2,255.64
" 4.....	998. L	Dec. 27, '06	Jan. 23, '08	.....	2,231	10,703.40	2,248.13
Monsecour—							
Section 1.....	998. L	Jan. 22, '06	Dec. 7, '07	.....	2,245	12,637.63	2,243.18
" 2.....	999. L	Jan. 22, '06	Dec. 7, '07	600.	368	13,163.99	2,336.61
" 3.....	"	Jan. 22, '06	Nov. 7, '07	700.	.....	14,068.19	2,497.10
" 4.....	"	Jan. 22, '06	Oct. 22, '07	800.	.....	12,574.33	2,231.94
" 5.....	"	Jan. 22, '06	Sept. 17, '06	444.	1,208	12,128.19	2,135.15
Totals	.....	.....	.....	2,944.	23,578	142,135.98	$ 28,063.04
Bertranville (Concrete Revetment ...				.....	.....	.....	1,225.69
				.....	.....	.....	$ 29,288.73

GRAND PRAIRIE DISTRICT.

Burton to Louderbough							
Section 1.....	1020. L	Oct. 5, '07	Dec. 27, '07	.....	3,455	12,378.34	2,908.91
Section 2.....	1021. L	Oct. 5, '07	Dec. 27, '07	.....	5,017	14,554.78	3,420.37
Totals	.....	.....	.....	.....	8,472	26,933.12	6,329.28
Burton to Louderbough (Wooden	Revetment		.....	.....	.....	.....	6,285.36
				.....	.....	.....	$ 12,614.64

During the same period new projects for bank revetment work were undertaken in front of the city of Natchez, Miss., and at Amesville, in New Orleans Harbor, work was resumed in the Third District Reach of New Orleans Harbor, and the revetments in Gouldsboro and Carrollton Bend (New Orleans Harbor), in Bondurant Chute, Kempe and Giles Bend were repaired or extended. The following statement summarizes the work done to April 20, 1908.

Bondurant Chute: Repairs were made to the upper bank pavement and the revetment extended down stream 1,000 feet, making the total length of revetment in the chute 3,440 feet. This completed all the work contemplated in this locality under the present project.

Kempe Bend: Extensive repairs were made to the revetment, principally at the lower end, where a cave destroyed about 800 feet of the work in September, 1906; the revetment was extended up

stream 230 feet, and 4,950 feet of connecting mattresses placed between sections 1 and 12, bringing the mattress work up to or above a 10-foot stage on the Vicksburg gauge. The present length of revetment in Kempe Bend is 10,871 feet.

Giles Bend: Extensive repairs were made to the revetment, principally at spurs 14 and 15, and between sections 28 and 30; the revetment was extended 2,200 feet, and now covers 20,328 feet of bank in two detached pieces—upper 8,192 feet, and lower 12,136 feet.

Natchez Front: This work was commenced in August, 1907, and during the season a total of 2,550 feet of bank was protected below low water with mattresses 300 feet wide and with rock pavement above low water where upper bank protection was considered necessary.

Carrollton Bend: In the Carrollton Bend 570 linear feet of mattresses, 250 feet wide, were laid along the 60-foot contour.

Amesville: At Amesville, 1,570 linear feet of mattresses, 300 feet wide, were placed in continuous revetment from low water mark to deep water in channel.

Gouldsboro Bend: Four new spur dikes (Nos. 2½, 3½, 4¼ and 5½), and three buttresses were placed in the Gouldsboro Bend. Old Spur Dikes Nos. 1, 2, 3, 4, 5 and 6 of the same series were repaired.

Third District Reach: In the Third District Reach 900 linear feet of bank were revetted with mattresses 300 feet wide.

RECAPITULATION.

Name of District	MILES		Cubic Yards	Cost
	New Levee	Enlargement		
Upper Tensas in Arkansas	4.83	8.69	890,668	$205,642.63
Upper Tensas in Louisiana } Fifth Louisiana Levee Dist.	0.32	....	55,187	13,195.22
Lower Tensas } Fifth Louisiana Levee Dist.	3.79	0.78	1,055,432	325,214.80
Atchafalaya Basin	2.47	....	479,146	85,498.81
Pontchartrain	1.30	11.93	765,902	113,514.80
Lafourche Basin	0.71	11.22	350,148	53,921.69
Lake Borgne Basin	0.55	4.46	142,136	29,288.73
Grand Prairie	....	1.60	26,933	12,614.64
Totals	13.97	38.68	3,765,552	$838,891.32

APPENDIX A. STATEMENT No. 22, SUMMARY ACCORDING TO DISTRICTS.

Approximate quantities and cost of levee work in the several levee districts of Louisiana and in Desha and Chicot Counties, Arkansas, from April 20, 1906, to April 20, 1908, by the Districts, State and United States, as shown in the foregoing Statement.

Name of District	By Whom Done	MILES: New Levee	MILES: Enlargement	Cubic Yards	Cost	Average price of Earthwork per Cu. Yd.—Cents
In Arkansas	Tensas Basin Levee District	1.29	6.57	428,897	$ 93,642.12	21.83
	United States	4.83	8.69	890,668	205,642.63	23.08
Totals		6.12	15.26	1,319,565	$ 299,284.75	.....
In Louisiana— Fifth Louisiana Levee District	District	5.54	7.57	1,254,963	$ 256,380.59	20.43
	State	2.49	13.93	828,797	1[illegible].957.45	18.09
	United States	4.11	0.78	1,110,619	338,410.02	30.47
Totals		12.14	22.28	3,194,379	$ 744,757.06	.....
Atchafalaya Basin Levee District	District	2.15	12.85	1,450,350	$ 321,483.74	22.16
	State	0.24	2.40	297,851	87,085.00	29.34
	United States	2.47	.....	470,146	85,498.81	17.84
Totals		4.86	15.25	2,227,347	$ 494,067.55	.....
Pontchartrain Levee District	District	0.71	3.68	246,505	$ 55,383.40	21.34
	State	0.96	1.47	193,041	34,282.82	17.76
	United States	1.30	11.93	765,902	113,514.80	14.82
Totals		2.97	17.08	1,205,448	$ 203,181.02	.....
Lafourche Basin Levee District	District	3.85	6.87	571,503	$ 140,582.73	24.60
	State	1.42	1.02	238,216	47,171.18	19.80
	United States	0.71	11.22	350,148	53,921.09	14.59
Totals		5.98	19.11	1,159,867	$ 241,675.60	.....

Name of District	By Whom Done	MILES: New Levee	MILES: Enlargement	Cubic Yards	Cost	Average price of Earthwork per Cu. Yd.—Cents
Orleans Levee District	District	1.65	4.05	273,743	169,432.79	53.00
Totals		1.65	4.05	273,743	$ 169,432.79	.....
Lake Borgne Basin Levee District	District	.....	.....	.....	.....	.....
	State	0.71	2.41	103,818	$ 24,358.14	23.46
	United States	0.55	4.46	142,136	29,288.73	19.74
Totals		1.26	6.87	245,954	$ 53,646.87	.....
Grand Prairie Levee District	District	.....	.....	.....	.....	.....
	State	1.43	2.00	79,672	$ 23,304.14	23.75
	United States	....	1.60	26,933	12,614.64	23.50
Totals		1.43	3.60	106,605	$ 35,918.78	.....
Buras Levee District	District	.....	.....	.....	.....	.....
	State	1.44	0.30	82,132	$ 26,389.52	23.17
	United States	....	.....	.....	.....	.....
Totals		1.44	0.30	82,132	$ 26,389.52	.....
Plaquemines Parish East Bank Levee District	District	5.94	13.78	423,395	$ 51,387.49	12.13
	State	1.25	.....	32,497	6,895.25	21.22
Totals		7.19	13.78	455,892	$ 58,282.74	.....
Caddo Levee District	District	0.89	.....	58,614	$ 8,572.95	14.62
	State	5.10	0.16	403,665	72,913.15	18.06
Totals		5.99	0.16	462,279	$ 81,486.10	.....

Name of District	By Whom Done	MILES		Cubic Yards	Cost	Average Price—Cents
		New Levee	Enlargement			
Bossier Levee District	District	0.98	.....	106,502	$ 20,151.52	18.92
	State	3.93	.....	381,871	81,326.64	21.29
Totals		4.91	.....	488,373	$ 101,478.16	.....
Red River, Atchafalaya and Bayou Boeuf Levee District	District	2.20	.....	145,119	$ 31,926.18	22.00
	State	1.64	3.35	229,030	$ 49,366.06	21.55
Totals		3.84	3.35	374,149	$ 81,292.24	.....
Red River and Bayou des Glaizes Levee and Drainage District	District	8.28	.....	474,682	$ 69,920.66	14.73
Totals		8.28	.....	474,682	$ 69,920.66	.....
Saline Levee and Drainage District	District	9.09	.....	340,296	$ 52,405.58	15.40
Totals		9.09	.....	340,296	$ 52,055.58	.....

RECAPITULATION.

Name of District	MILES		Cubic Yards	Cost
	New Levee	Enlargement		
In Arkansas	6.12	15.26	1,319,565	$ 209,284.75
In Louisiana—				
Fifth Louisiana Levee District	12.14	22.28	3,194,379	744,757.06
Atchafalaya Basin Levee District	4.86	15.25	2,227,347	494,667.55
Pontchartrain Levee District	2.97	17.08	1,205,448	203,181.02
Lafourche Basin Levee District	5.98	19.11	1,150,867	241,675.60
Orleans Levee District	1.65	4.05	273,743	169,432.79
Lake Borgne Basin Levee District	1.26	6.87	245,954	53,646.87
Grand Prairie Levee District	1.43	3.60	106,605	35,918.78
Buras Levee District	1.44	0.30	82,132	26,389.52
Plaquemines Parish East Bank Levee District	7.19	13.78	455,892	58,282.74
Caddo Levee District	5.99	0.16	462,279	81,486.10
Bossier Levee District	4.91	.....	488,373	101,478.16
Red River, Atchafalaya and Bayou Boeuf Levee District	3.84	3.35	374,140	81,202.24
Red River and Bayou des Glaizes Levee and Drainage District	8.28	.....	474,682	69,920.66
Saline Levee and Drainage District	9.09	.....	340,296	52,405.58
Totals	77.15	121.09	12,410,711	$2,713,819.42

APPENDIX A. SATEMENT No. 23. SUMMARY ACCORDING TO STREAMS.

Approximate quantities and cost of levee work in the several Levee Districts of Louisiana and in Desha and Chicot Counties, Arkansas, from April 20, 1906, to April 20, 1908, by the Districts, State and United States, as shown in the foregoing statements.

Stream	Levee District	By Whom Done	MILES		Cubic Yards	Cost
			New Levee	Enlargement		
In Arkansas—						
Arkansas River	Tensas Basin	United States	1.18	.....	109,739	$ 23,493.45
Totals			1.18	.....	109,739	$ 23,493.45
Mississippi River	Tensas Basin	District	1.20	6.57	419,297	91,266.12
		United States	3.65	8.69	780,929	182,149.18
Totals			4.85	15.26	1,200,226	$ 273,415.30
In Louisiana—						
Mississippi River	Fifth Louisiana	District	5.54	7.57	1,254,963	$ 256,389.59
		State	2.49	13.93	828,797	149,957.45
		United States	4.11	0.78	1,110,619	338,410.02
	Atchafalaya Basin	District	2.15	8.02	1,270,967	287,410.87
		State	0.24	2.40	297,851	87,685.00
		United States	2.47	.....	479,146	85,498.81
	Pontchartrain	District	0.71	3.68	246,505	55,383.40
		State	0.96	1.47	193,041	34,282.82
		United States	1.30	11.93	765,902	113,514.80
	Lafourche Basin	District	3.85	6.87	571,503	140,582.73
		State	1.42	1.02	238,216	47,171.18
		United States	0.71	11.22	350,148	53,921.60
	Orleans	District	1.65	2.34	254,938	161,757.97
	Lake Borgne Basin	District				
		State	0.71	2.41	103,818	24,358.14
		United States	0.55	4.46	142,136	29,288.73
	Grand Prairie	District				
		State	1.43	2.00	79,672	23,304.14
		United States	....	1.60	26,933	12,614.64
	Burns	District				
		State	1.44	0.30	82,132	26,389.52
		United States				
Totals			31.73	81.00	8,297,287	$1,927,921.50

Stream	Levee District	By Whom Done	MILES: New Levee	MILES: Enlargement	Cubic Yards	Cost
Red River	Caddo	District	0.89	.....	58,614	$ 8,572.95
		State	5.10	0.16	403,665	72,913.15
	Bossier	District	0.98	.....	106,502	20,151.52
		State	3.93	.....	381,871	81,326.64
	Red River, Atchafalaya and Bayou Boeuf	District				
		State	....	3.35	116,910	26,997.68
	Saline	District	9.09	.....	340,296	52,405.58
	Red River and Bayou des Glaizes	District	8.28	.....	474,682	69,920.66
Totals			28.27	3.51	1,882,540	$ 332,288.18
Atchafalaya River	Atchafalaya Basin	District	....	4.83	179,383	$ 34,072.87
	Red River, Atchafalaya and Bayou Boeuf	District	2.20	.....	145,119	31,926.18
		State	1.64	.....	112,120	22,368.38
Totals			3.84	4.83	436,622	$ 88,367.43
Ouachita River	Tensas Basin	District	0.99	.....	9,600	$ 2,376.00
Totals			0.99	.....	9,600	$ 2,376.00
Gulf Coast	Plaquemines Parish East Bank	District	5.94	13.78	423,395	$ 51,387.49
		State	1.25	.....	32,497	6,895.25
Totals			7.19	13.78	455,892	$ 58,282.74
Interior Levee	Orleans	District	....	1.71	18,805	$ 7,674.82
Totals			....	1.71	18,805	$ 7,674.82

APPENDIX A. STATEMENT No. 23—Continued. SUMMARY ACCORDING TO STREAMS.

RECAPITULATION.

	MILES		Cubic Yards	Cost
	New Levee	Enlargement		
Arkansas River in Arkansas	1.18	.....	109,739	$ 23,493.45
Mississippi River in Arkansas	4.85	15.26	1,200,226	273,415.30
Mississippi River in Louisiana	31.73	82.00	8,297,287	1,927,921.50
Red River	28.27	3.51	1,882,540	332,288.18
Atchafalaya River	3.84	4.83	436,622	88,367.43
Ouachita River	0.09	.....	9,600	2,376.00
Gulf Coast	7.19	13.78	455,892	58,282.74
Interior Levees	....	1.71	18,805	7,674.82
Totals	77.15	121.09	12,410,711	$2,713,819.42

APPENDIX A. STATEMENT No. 24. SUMMARY.

GRAND TOTAL.

	MILES		Cubic Yards	Cost		Total Cost
	New Levee	Enlargement				
			LEVEE WORK			
Districts	42.57	55.37	5,774,569	$1,271,278.75		
State	20.61	27.04	2,870,590	603,649.35		
United States	13.97	38.68	3,765,552	838,891.32		
Totals	77.15	121.09	12,410,711	$2,713,819.42		$2,713,819.42
			DRAINAGE			
	MILES		EXCAVATION			
	Excavation	Clearing	Cubic Yds.	Cost	Cost Clearing	
District	4.80	10.06	110,100	$ 19,795.98	$23,138.00	$ 42,933.98
		IMPROVING BAYOU LAFOURCHE				
Districts	0.40	.....	44,980	$ 7,664.56	.....	$ 7,664.56
	Revetment for Bank Protection 3rd Dist. Improving Miss. R.					
United States						$ 170,276.90
					Total	$2,934,694.86

APPENDIX B.

COPIES OF SPECIAL REPORTS, LETTERS, ETC., FROM THE BOARD OF STATE ENGINEERS TO THE GOVERNOR OF LOUISIANA, THE VARIOUS LEVEE BOARDS AND COMMISSIONERS, POLICE JURIES, AND TO OTHERS INTERESTED IN OPERATIONS GENERALLY CONNECTED WITH THE DEPARTMENT.

APPENDIX B.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., August 28, 1906.

To His Excellency, Newton C. Blanchard, Governor of Louisiana, Baton Rouge, La.:

DEAR SIR—I returned to New Orleans yesterday, after an absence of eight days, during which time, accompanied by Assistant State Engineer Lombard, I attended a meeting of the Board of Commissioners of the Saline Levee and Drainage District, at Marksville, La. At this meeting the necessary steps to perfect organization were taken, a report of the needs of the district presented by the Board of State Engineers, the taxes and forced contributions permitted by the law levied for the year 1906, and the President of the Board of Commissioners of the District authorized and directed to have printed and to sell bonds to the extent of $100,000.00—that is, 100 bonds of the denomination of $1,000 each—to cover the cost of as much of the work recommended to be done as it might be possible to undertake and execute in the course of the approaching levee season.

The report of the Board of State Engineers showed that the line of levee required to cover the front of the levee district, facing on Red River, would approximate 17.5 miles in length, and contain about 750,000 cubic yards of earthwork.

It is understood that, as soon as the district has succeeded in converting the bonds authorized to be sold into cash, the necessary engineering work by the Board of State Engineers, and building operations by the levee district will promptly follow.

From Marksville, Mr. Lombard returned to New Orleans, and I proceeded to Shreveport.

At Shreveport I promptly called on Senator T. C. Barrett and Mr. W. S. Atkins, and had a conference with them in regard to the situation in the Caddo Gas Fields, as requested by you in your letter of the 3rd inst. Following this, I made a tour of inspection of the Gas Fields, with Mr. J. W. Jolly, a representative of the Citizens Oil and Pipe Line Co., from whom I received marked

attention and courtesy and obtained much valuable information.

To as briefly as possible sum up my observations, I found that well No. 2 of the Producers Oil Company, in regard to which I reported to you, under date of December 3rd, 1905, had expired on the night of Saturday, the 18th inst., and was as quiet and placid as Well No. 1 of the same company, also reported upon under the same date.

From the best information obtainable, and personal observation, the conduct of Well No. 2 and that of Well No. 1 (Producers Oil Company) was practically identical, the period of its activity about the same, and its collapse due to the same simple natural causes—closely following the lines of treatment for controlling it aready suggested to you by me.

In addition to Well No. 2 (Producers Oil Company), Well No. 1 (generally called the "Gilbert Well") of the Citizens Oil and Pipe Line Company, about one and one-half miles nearer Shreveport, "blew out" and caught fire some time last January, remaining active with flame and gas until the end of July, when it spontaneously ceased to burn, though remaining apparently as active in the escape of gas as ever. This well was fired again and spontaneously ceased burning twice between that time and August 5th. From August 5th to August 17th no firing occurred, but on August 17th it was again fired, burning until Sunday night, August 19th, when it again spontaneously ceased burning. When seen by me last Wednesday, the well was simply a mass of turbulent mud and water, within a crater about 150 feet in diameter, the surface of the fluid mass being some five feet below the natural surface of the surrounding ground and fitfully upheaving, within a circular area of about 50 feet in diameter, eddying around about the center of the crater, to a height varying from about five feet to ten feet.

All other live wells in the field were under control.

The escape and loss of gas from Well No. 2 (Producers Oil Company) and Well No. 1 (Citizens Oil and Pipe Line Company) has been enormous, variously estimated at from 20,000,000 to 30,000,000 cubic feet per day, during a period of sixteen months. This has had the effect of presently lowering to some extent the pressure of the gas in the other wells in the field. It is, however, my opinion that a reaction will occur with the closure of all "Wild Wells."

To return to the present "Wild Well" No. 1 (Citizens Oil and Pipe Line Company), it is just possible that its activity will be of comparatively short duration. But, while the forces that are at

work gradually but surely smothering it, are clear to observation and deduction, the length of time that may be required to effect the end cannot be forecasted with any greater degree of certainty than in the case of the other "Wild Wells."

So that, considering that the continued loss of gas is so great, it is questionable whether delay in closing this well should be permittted —especially as the cost of quieting and closing it appears so very small as compared with the estimated losses from the well itself, commercially and otherwise.

The means being assured, the assembling of the necessary rigs, machinery and material, and the construction of the other necessary parts of the work required, as well as the quieting and closing of the well, should, under intelligent direction and comprehensive effort, be accomplished in about thirty days.

In general terms, as you will recall, the method for quieting and closing the "Wild Wells" in the Caddo Gas Fields, which appeals to me, and which I am disposed to recommend, is as follows: At opposite sides of the crater and within as close proximity as possible, sink at least two wells, each of a daimeter equal to that of the "Wild Well" originally, down to the vein supplying it, to divide the service; raise to a height about equal to the average upheaval of the fluid mass in the crater, around its rim, an embankment of approved cross section; conduct or pump water into the crater and area within the embankment up to a safe margin within the latter; feed this steadily with earth until the whole mass becomes loaded with all the earth the fluid mass within the crater will receive, allowing the auxiliary wells, during this process, to blow off, under control. As you will understand, this description is very general in its character, and much detail must follow in the event of the methods being applied.

Having closely observed the conduct of the other "Wild Wells" in the Caddo Gas Fields, obtained reliable information in regard to the extent and shape of the craters, and the "rock pressure" of the gas, I have little or no reason to doubt the success of this method, if properly applied. As to the cost of the undertaking, it should not at this time exceed $10,000.

From Shreveport, I went to Vicksburg, to attend a levee letting at the office of the United States Engineers there, where something more than 1,500,000 cubic yards of earthwork, previously advertised by the United States, was offered to bidders for construction, and in which the State of Louisiana was directly interested to the extent of about 750,000 cubic yards, contained in new levees required at

Chicot Front and Matthews Bend, in Arkansas, and at Mascot, Madison Parish, La. Favorable bids were submitted on all of these levees, and, though not yet officially advised of the recommendations of the United States Engineer in charge, I have little doubt but that they will receive his endorsement and be accepted by the Secretary of War.

The new levee required along the Chicot Front in Arkansas will be undertaken jointly by the United States and the Tensas Basin Levee District, the former allotting $30,000, and the latter $60,000, towards the cost of the work.

With regard, believe me, always.

Yours very truly,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., May 22, 1907.

To His Excellency, Newton C. Blanchard, Governor of Louisiana, Baton Rouge, La.:

DEAR GOVERNOR—In compliance with your wishes, expressed here yesterday at the meeting of the Executive Committee of the Joint Organization of the Atchafalaya Basin Levee District and the Lafourche District, to receive proposals to construct a lock in Bayou Lafourche, at or near its head, I have the honor to mail you with this copy of "Advertisement, Specifications, General Conditions, Proposals, etc., for the construction of a lock at the head of Bayou Lafourche, La." marked "A," and copy of "Advertisement, Specifications, General Conditions, Proposal, etc., for the Construction of a Lock and Approaches at the Head of Bayou Lafourche La.," marked "B," the two forms furnished to prospective bidders upon which to base proposals to be submitted October 1, 1906, and May 21, 1907, respectively.

The document marked "A" was prepared by the Board of State Engineers at the request of the Joint Organization, expressed in a resolution passed at a meeting held at Donaldsonville, La., November 10, 1906. This with the plans illustrating the location, character and extent of the work, were submitted to the Secretary of War for approval June 20, 1907, and returned by the latter approved with certain modifications and additions November 20, 1907.

It will be noted that these plans and specifications (document

marked "A") included only the lock chamber, gates and operating gear, leaving the tests, approaches, etc., to be provided for at another time.

Advertisement for proposals to construct this work was not ordered until June 13, 1906.

Special attention is called to paragraphs marked (1), (2), (3), opposite marginal note "Payments" in document marked "A."

While not so stated, in exact terms, the inference to be drawn from these paragraphs is that payment would be made in cash.

I do not think that any other view of it was at that time taken by the Board of State Engineers, though it has since been stated by members of the Joint Organization and others that payment in "such obligations as were authorized by law" *only* was intended.

Under the advertisement, etc., marked "A," the Joint Organization met at the place and on the day specified, October 1, 1906, to receive such proposals as might be submitted. But one proposal was submitted, that of "The Foundation Company of New York," which amounted to about $603,000.00. This, with an approximate estimate of the probable cost of tests, approaches, etc., amounting to $100,000.00, was duly referred by the Executive Committee to the Joint Organization for consideration and discussion, resulting in the proposal being rejected on the ground of excessive cost, in which the Board of State Engineers concurred.

At this same meeting it was also agreed to re-advertise for proposals, but no action was taken towards the advertisement of this fact until January 21, 1907, when, at a meeting of the Joint Organization, at Donaldsonville, the following resolution was passed, viz.:

"*Resolved,* That in view of the necessity of the Joint Boards re-advertising and asking for bids to build the Lock in Bayou Lafourche at or near the town of Donaldsonville.

"That the Board of State Engineers be requested to go through the specifications of the Locks contemplated and eliminate any part they may think superfluous and anything or part not specified in said specifications to make said Locks and approaches complete be added, so that when the advertisements for bids is made, it will be complete in all of its parts. This resolution contemplates receiving bids in full for all the work to be done on said Locks."

Under this resolution the Board of State Engineers at once took up a study of the situation and of the plans and specifications for the proposed lock, suggesting an early announcement to contractors,

through at least two dailies in the State, and two at such prominent cities of the United States as were most likely to attract attention.

Thus the following "Notice to Contractors" was inserted by the Executive Committee in the New Orleans *Picayune,* the *Times-Democrat* and *Daily States* at New Orleans, and in the *Engineering News,* of New York, and *American Contractor,* of Chicago, viz:

NOTICE TO CONTRACTORS.

Lock and Approaches at the Head of Bayou Lafourche, La.

OFFICE EXECUTIVE COMMITTEE, JOINT ORGANIZATION ATCHAFALAYA BASIN AND LAFOURCHE LEVEE DISTRICTS, DONALDSONVILLE, LA., March 9, 1907.

Sealed proposals for the construction of a Lock and approaches at the head of Bayou Lafourche, La., will be received up to 12 o'clock noon, Tuesday, May 21, 1907, at the office of the Board of State Engineers of Louisiana, Room 402 Cotton Exchange Building, New Orleans, La., and then publicly opened.

Information will be furnished by the undersigned or by the Board of State Engineers, of Louisiana, on application.

J. S. BRADY,
Chairman Executive Committee, Joint Organization Atchafalaya Basin and Lafourche Levee Districts, Room 401 Cotton Exchange Building, New Orleans, La.

W. J. MCCUNE,
Secty. Joint Organization.

The resolution of the Joint Organization, passed January 21, 1907, as you will note, called not only for amplifying the first plans and specifications, set forth in document marked "A," as first submitted, but required provision also for the necessary tests, approaches, etc.

All of this, together with the fact that considerable stress had been laid upon the advisability of the lock's being, in its class, in all respects up to date, was taken under consideration by the Board of State Engineers, as shown in document marked "B," completing the said plans and specifications in conformity with the wishes of the Joint Organization, as expressed by resolution, and submitting them to the Executive Committee under date of April 22, 1907.

At the request of the Executive Committee, these plans and specifications were then forwarded by the Board of State Engineers to the Secretary of War, through Captain J. F. McIndoe, Corps of Engineers, U. S. A., on April 23, 1907, for approval, and were

received from the Secretary of War, in return, approved without a single exception, under date of May 15, 1907.

The matter of the time and manner of payment having been open to some question and veiled in some doubt, the Board of State Engineers addressed a request to the Chairman of the Executive Committee for specific information on the subject, reading as follows:

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., March 22, 1907.

Mr. J. S. Brady, Chairman Executive Committee, Joint Organization, Atchafalaya Basin and Lafourche Levee Boards, New Orleans, La.

DEAR SIR—As the Board of State Engineers is now revising the plans and specifications for the construction of a Lock at the Head of Bayou Lafourche, in compliance with the request of the Joint Organization of the Atchafalaya Basin and Lafourche Levee Boards, it is desired, in order to incorporate the facts in the information to be furnished to prospective bidders, to officially know upon what terms payment will be made to contractors, as the work progresses, and upon completion and final acceptance.

It is understood that resolutions were some time ago passed by the Joint Organization governing this question, and the Board of State Engineers would, for its guidance, be pleased to be informed on the subject, and furnished with a copy of said resolutions.

Very respectfully yours,

(Signed) FRANK M. KERR,
Chief State Engineer.

To this the Executive Committee replied as follows:

NEW ORLEANS, LA., April 10, 1907.

Hon. F. M. Kerr, Chief State Engineer, City:

SIR—Enclosed you will please find a certified copy of a resolution of the Joint Organization of the Atchafalaya Basin and Lafourche Levee Boards.

Very respectfully,

(Signed) W. J. MCCUNE,
Acting Secretary.

"Be it resolved, that the building of the locks shall be settled for as the work progresses by notes issued under Act No. 9 of 1900

and all acts amendatory thereto; provided, that each note shall be for $20,000.00, to mature according to law."

I hereby certify that the above and foregoing is a true and correct extract from the minutes of the Joint Organization of the Atchafalaya Basin and Lafourche Levee Boards of April 9th, 1907.

(Signed) W. J. McCUNE,
Acting Secretary.

Special attention is called to paragraphs (1), (2), (3), page 2, document marked "B," opposite the marginal note "Payments"—based upon the information furnished by the Joint Organization.

In this the intention of the Joint Organization, as to time and manner of payment, when compared with the law on the subject, cited, is clearly set forth, and the task of financing the proposition is placed upon the shoulders of prospective bidders.

As a matter of fact, however, it must be said that the wording of these paragraphs is not without precedent. In fact, all State contracts for levee work read practically that way, viz.: specification No. 10, reading as follows: "The said State of Louisiana engages to pay said contractor in such obligations as are provided for in Section 4 of Act No. 33, Session of 1879."

To the great credit of the State and the good fortune of contractors, however, all such obligations provided for by the State are, and have been for many years past, promptly honored by it, and have grown to mean to the public, without the shadow of a doubt, payment in cash on presentation.

However, this is somewhat of a digression.

The printed form marked "B," with complete explanatory plans—eleven sheets—were furnished to any prospective bidder on application, and to show you the amount of detail work involved in preparing them, I mail you with this a set of said drawings.

While the nicety and seriousness of the undertaking should not be underrated, from a technical and practical point of view, there is, in my opinion, nothing exceptional in the plans and specifications prepared, by request, by the Board of State Engineers for the Joint Organization, nor is there any well founded reason to believe that any insurmountable engineering difficulties, sufficient to shake the confidence of builders, are involved in their construction.

There has never been any doubt in my mind, however, but that there were two circumstances or conditions connected with the announcements of the project for the Bayou Lafourche Lock which would operate to discourage contractors from bidding—first and fore-

most, the time and manner of payment for the work, as expressed in the information to prospective bidders; and second, the agitation, in various quarters of the two levee districts interested, against the project, forecasting the probability of injunctions against the prosecution of the project, and consequent suspension of work, with all its attendant inconveniences, delays and probable loss to contractors.

In spite of this agitation, however, had the Joint Organization felt itself able to announce specifically that all payments to contractors which it might engage to make, under the terms of a contract, would be in cash, there is little or no doubt in my mind but that several bids for the work would have been submitted.

Of the merits of the agitation in regard to the Bayou Lafourche Lock, pro or con, referred to, it is difficult for me to speak fully, except to say that they no doubt simply voice, locally and personally, the views and interest of the various bodies and individuals participating in them.

Of the imperative legal obligations involved on the subject, I would not pretend, nor should I be expected to pass, but will not hesitate to say that I believe, unless released by legislation brought about by some popular expression or movement, or enjoined by the courts of the State, on grounds recognized by them as eminently proper, no recourse is left the Joint Organization but to carry out the project for improving Bayou Lafourche in its entirety, which includes the construction of the Lock, if it be possible to do so, and that the only impossibility that appears to me to present itself lies in its apparent inability, possibly through defective legislation, as stated by it, and of which it should properly be the judge, to finance the proposition.

Personally, I believe the closure of Bayou Lafourche, at its head or departure from the Mississippi River, by a dam or lock, of incalculable benefit to the whole section of the State traversed by the bayou. More interests and more purposes might possibly be subserved by a lock than by a dam, but the closure of the bayou *per se,* in any form whatsoever, is of paramount importance, all other considerations to the contrary notwithstanding.

In the light of modern progress and the general demand for the improvement and enhancement of inland waterways, which I heartily applaud, the construction of a lock in lieu of a dam or levee in Bayou Lafourche can not and should not be opposed; but in the minds of many, of which I am one, it is a grave question whether the diversion of the funds provided for levee purposes from the uses

for which they were primarily conceived should ever have been sanctioned. This, however, is but a matter of opinion, and the question at issue has gone beyond any useful expression of it. The State, through the General Assembly, has spoken, obligations have been made and recorded, and nothing remains for those charged with the control of affairs but to devise ways and means to fulfill them, if possible.

Yours very truly,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., June 4, 1907.

To His Excellency, Newton C. Blanchard, Governor of Louisiana, Present:

DEAR SIR.—After receiving your letter of the 22nd ult., requesting the Board of State Engineers to arrange to meet, at the office of the Board, here, in New Orleans, at 10 a. m., Tuesday, June 4th, to discuss, with you, the Board of Commissioners of the Orleans Levee District, the Board of Commissioners of the Port of New Orleans, and others, measures for raising and strengthening the lines of levee now protecting New Orleans, it occurred to me that a report describing in a general way conditions at this time, along the lines of levee in the Parish of Orleans, bordering on the Mississippi River, understood to be the lines of levee for the raising and strengthening of which it is proposed to discuss measures, might be expected from this Department and considered serviceable.

To this end, a close inspection of the lines of levee on both banks of the river, in the Parish, has been made by the Board of State Engineers during the past week, and memoranda of the observations made are attached hereto.

It will, of course, be understood that these are not the only lines of levee upon which New Orleans is dependent for protection from overflow. In the continuity and integrity of the lines of levee on both sides of the river for many miles above and below the City, New Orleans is also very largely interested, and upon its interior and back levees, as well, much at times depends.

The lengths of the lines of public levee in the Oreans Levee District with the construction and maintenance of which the Board of

Commissioners of the District is charged, are as follows: on the left, or east bank, about 13.0 miles; on the right, or west bank, about 14.0 miles; and in "Rear Protection Levees," about 50 miles—a charge of serious import and vast possibilities, involving great niceties of conception and design, and large outlays of money, if required to be treated comprehensively.

Condensing the statement (Memoranda of Observations) attached, the following may be found, viz.: of the 13 miles of levee on the left, or east bank, 3 per cent of the length of line is from 3.5 to 4.0 feet above the highest water of record (1903); 38 per cent from 3.0 to 3.5; 17 per cent from 2.5 to 3.0; 5 per cent from 2.0 to 2.5; 12 per cent 1.5 to 2.0; 4 per cent from 1.0 to 1.5; 4 per cent from 0.5 to 1.0; 7 per cent from nothing to 0.5 feet; while 3 per cent is from nothing to 0.5 feet below the high water of 1903; 7 per cent from 0.5 to 1.0; 1 per cent from 1.0 to 1.5; and 1 per cent from 1.5 to 2.0 feet below the high water of 1903.

Of the 14 miles on the right, or west bank, with the exception of a number of noticeable short stretches along the Commercial Front, the line of levee in the Parish of Orleans will average generally fully 2.0 to 3.0 feet above the high water of 1903.

It will also be found by reference to this statement that, while some parts of the line, extending above Napoleon Avenue, on the left or East Bank, and extending below the Naval Station Reservation, on the right or west bank, are well located, have been built to fairly good grade and cross section, and are generally in comparatively good condition, other parts, on both banks of the river, compare unfavorably with any standard, and some parts are absolutely deficient and insecure.

This, with some slight exceptions, is notably the case, from Esplanade Avenue to near Flood Street, on the left or East bank, a distance of about 2.5 miles, where the line of levee is mostly too close to the edge of the bank of the river, and made up of a combination of timber bank protection and earth embankments, in the form of skeleton wharves, bulkheads backed up with meagre sections of earth, "box levees," filled with earth, etc., etc.

On the right or west bank, but little of a more favorable character can, from the standpoint of levees to protect, be said of the greater part of the line extending from the Parish line down to the Naval Station Reservation.

These are the facts, stated in a somewhat glitteringly general way it is true, which may be gleaned from this inspection.

There is, however, nothing particularly new in these statements—only, with each year's growth of the City, each year's advance in improvements, each year's increase in population, the risks and dangers that would result from an accident to the line of protection from overflow grow more and more grave.

During every period of high water in the past, there has been, in various quarters, more or less suppressed anxiety and apprehension in regard to the safety of New Orleans from overflow, and, after most of such periods, some spasmodic discussion in regard to devising ways and means to correct this, has followed.

Thus in 1903, after the river had generally returned to its banks, a conference, between the Board of Commissioners of the Orleans Levee District, the Board of Commissioners of the Port of New Orleans, and the Board of State Engineers, was called by Governor W. W. Heard, to discuss the situation and measures for improving it.

This resulted in the formulation of a tentative proposition to raise the levees along the Commercial Front of the City to a grade equal to 23.2 on the Canal Street gauge, or practically 3 feet above the high water of 1903, with a crown not less than 50 feet in width from a line of bulkheads placed at or near the river bank, and a slope, on the land side, of from 11 to 16 to 1, dependent upon local conditions.

This project was approved by all parties to the conference as a step in the right direction, and a great deal of excellent work has since been done along those lines by the Orleans Levee District and the Port Commission.

Yet, such even being the case, the fact still remains that instead of leading the State in improvements insuring levee protection, New Orleans has fallen behind. So, that, be the cause what it may—it is understood and generally believed that the resources of the district are altogether inadequate—its lines of defense to-day compare unfavorably, as a whole, with those of almost any other levee district in the State, above New Orleans, as a whole.

It is to discuss these facts and the measures necessary to bring about a more satisfactory condition of affairs that you have called the conference to be held here to-day.

In connection with the financial end of the proposition, the Board of State Engineers can render no material service, but, in conection with plans to raise, strengthen, and otherwise improve the lines of levee now protecting New Orleans, some general suggestions will no doubt be expected from it, and, therefore, bearing in mind the commanding position held by the City of New Orleans in the affairs of

the world, the enormous interests and great number of lives at stake, and the promise of its still greater possibilities of advancement, and increase in population, begs leave to submit the following:

First: Wherever the banks of the river, within the Parish, or within the Port of New Orleans, are to any degree unstable, harbor lines shall be established, and the bank so fixed by proper treatment that there will be not only no more retreating from it, but, on the contrary, all classes of craft may always moor next to it, and private and public improvements spread out towards and embrace it.

This part of the work is no doubt of a National character, and, through energetic and proper appeals and representations, the United States should, and it is believed will, render valuable aid towards it, if not assume it altogether.

Second: The entire river front, as rapidly as circumstances and conditions may make it possible to do so, should be raised to a grade of not less than five (5) feet above the highest water of record, with a crown not less than 100 feet wide, and slopes so flat as to make the approach to the crown inappreciable.

This filling might then be paved for traffic, and built upon under municipal ordinances, with such improvements as property owners might deem it to their interest to promote, or existing improvements, where justified, raised to the new grade.

In this way, it will be seen that no movement of the river bank, of which there is any precedent or record, within the limits of the Parish of Orleans, would at any time involve any danger to the City, whether the river banks be protected or not.

The question of expropriation of property could in this way, by amending the State law prohibiting the obstruction of the public levees, be also greatly simplified, if not nullified.

In the same connection, while, at first blush, it might present a rather monumental aspect, it is not by any means a chimerical proposition to go even further than this in the matter of filling, and say, when the bed of the Mississippi River, on its convex shores, and the bed of Lake Pontchartrain, are at our door, from which to draw the material, that the City of New Orleans, proper, could in time be raised to a grade varying from 5.0 feet above high water along the Mississippi River, to five feet above Mean Gulf Level along Lake Pontchartrain, with spacious docks and approaches of the most advanced types, extending from its upper to its lower limits. Chicago, years ago, did not hesitate; the Oakland Flats, Cal., and the Potomac Flats, near Washington, D. C., were not regarded as presenting any

insurmountable difficulties; and, latterly, our next door neighbor on the Gulf, Galveston, did not falter over practically a similar proposition as herein suggested for New Orleans in the future not to mention numerous other projects of a similar character in many other parts of the country. Why then should New Orleans hesitate?

Any conclusions, however, in regard to any advanced ideas and projects to govern in the premises, can be arrived at only from minute studies of the situation, detailed surveys and well defined plans and specifications. Without these, it would also be impracticable to arrive at estimates of cost, or the extent to which the financial resources of the Orleans Levee District should be increased.

It might, therefore, be well, before adjourning this meeting, to discuss the posibility of the Orleans Levee District being able, through its present engineering force, or by the engagement of a special commission of engineers, properly equipped, to investigate the general situation and make the surveys needed, and to submit, for discussion and action, a detailed report, with recommendations in regard to the order of locality to be treated and the character of work to be performed, to a conference similar to this.

Finally, it must not be overlooked, that the consummation of any project whatsoever, equal in every respect to the demands of the situation, will involve vast expenditures of money and consume many years of time in its execution.

Respectfully,

THE BOARD OF STATE ENGINEERS,

Per FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., APRIL 2, 1908.

To the Honorable President and Members, Tensas Basin Levee District, Monroe, La.:

GENTLEMEN—I have the honor to report that since the last meeting of your Board, I have made a thorough inspection of the entire line of levee upon which your district is dependent for protection, beginning at Pine Bluff, Ark., on March 3rd. On this trip there were Major Henry B. Richardson, member of the Mississippi River Commission; Captain Clarke S. Smith, Corps of Engineers U. S. Army, in charge of the Third District; Mr. A. Miller Todd, U. S.

Assistant Engineer in charge of levees on the Arkansas-Louisiana side in the Upper Tensas District; Colonel Frank M. Kerr, Chief State Engineer, and myself. We made a continuous team and horseback trip over the entire line. We were able to get a better idea of the levees along the Arkansas River than ever previously, owing to the convenient way in which we made the trip. We had a steamboat following us, on which we spent the nights.

There still remains to be constructed a gap of about twelve miles in Lincoln County, and of about six miles through the Arkansas State Farm in Jefferson County. The levees in these two stretches are not more than eight feet in height, and forces of convicts are now engaged in improving the inadequate levees through the Convict Farm. The balance of the line has all been improved, and a grade of about three feet above the highest water maintains throughout the upper end of the Arkansas River levees. All levees have been constructed with about 2 to 2½ to 1 slopes, with crown 4 feet, and show an extraordinary effort on the part of the levee authorities for their betterment. The line, however, is generally bare of sod and much abused by travel. Hogs generally roam at large, and their rooting was much in evidence. There still remains, therefore, for the levee authorities on the Arkansas River to maintain their levees after construction. The grade and section of the levees, while very much inferior to those on the Mississippi River, show a very great improvement over former conditions. But there seems to be no united effort on the part of the levee authorities on the south bank of the Arkansas River to maintain their levees and protect them against wear and tear after their construction.

From the Convict Farm to Auburn all of the levees are about in the same condition as stated above.

From Auburn to Red Fork, a very much improved section and better sodding are evident.

From Red Fork to Lake Jefferson the levees are built with an eight-foot crown, slopes of 3 and 3 to 1. They are, therefore, as good as those below. During the past several years the United States Government has let and partially constructed about sixty stations more of the gap between Lake Jefferson and Boggy Bayou. This line of levee, however, is not continuous, as there still remain two short incompleted gaps in it.

The policy of your Board still remains to contend for the extension of the line up Amos Bayou westward to a point above overflow, as the time is not yet ripe for the junction of the Arkansas River

levees with those of the Mississippi River upon which your Board depends for protection. Better organization on the part of those Boards north of your line, thereby guaranteeing the construction of any considerable loop on the Arkansas River that may be required of them, is essential to this proposition, as it would not be justice to yourselves to undertake the maintenance of some 80 or 90 miles more of levee than you are now charged with in the State of Arkansas.

The condition of the levees from Costello's Gin to the Arkansas-Louisiana line is all that can be desired, except that there still remain certain stretches of levee whose grade is below that which it is desirable for the levees of that section to have, and which has been recommended by Capt. G. M. Hoffman, Corps of Engineers, U. S. A., and adopted by the Mississippi River Commission, namely, 4 feet above the highest water of record, with crown 8 feet and slopes of 3 and 3 to 1. When the outstanding contracts will have been completed, practically the entire line in Chicot County will have been improved to the grade as above; but there still remain to be done several important and high-priced pieces of work, among which the Fulton Lake Levee is the largest and most important. This levee was improved by your Board in 1903-04 to a grade 4 feet above the then existing high water mark, but the high water of 1903 overtopped the highest previously recorded by about 2 feet, so that the Fulton Lake Levee now stands only about 2 feet above the 1903 high water mark. The condition of this levee, however, had been materially improved by your Board at the time named, by having placed throughout its entire length a river side enlargement.

There are still also some stretches on the line going across country from Lucca Landing to Costello's Gin which need enlargement and improvement, and it has been my opinion that the construction of the levee from Lake Jefferson across country, if extended to any considerable length, would materially affect the grade line required on the former stretch, especially near the junction of the two, say from Lucca Landing to Amos Bayou. I might add, however, that I do not believe this opinion is shared by the United States Engineers.

The levee line on the Mississippi River is in excellent condition, well sodded, etc., and very little abuse is noticeable on it—scarcely any in Chicot County.

The amount of work done in your district from April 20, 1906, (the date of the last biennial report of the Board of State Engineers) to date, by the district is about as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee raised and Enlarged	Cubic Yards of Earthwork	COST
By the District	1.29	6.57	428,897	$93,642.11

There still remains to be done, under outstanding contracts, 422,-212 cubic yards, to cost about $123,110.57 (including percentages retained on partial payments).

The failure of the contractor to complete the Chicot Levee is due entirely to the shortness of the levee building season last year, and the lack of drainage across a cypress brake between stations 660 and 683+50. This lake holds water at all seasons of the year, and offers a soft, boggy foundation. A drainage ditch was cut by your district from the bottom of this cypress brake into the river, and it was drained, but, owing to the lateness of the season, no earth could be obtained from the area between the levee and river; and as the ditch later became dangerous, on account of the rising river, it was closed through the levee, and water allowed to again accumulate in the lake. Owing to this condition, which prevented the completion of this work, an extension was recommended to your Board, and the Desha Levee Board was called upon and immediately proceeded to furnish 20 additional acres of right of way for a borrow pit on the side of the lake, from which to obtain dirt for the construction of the dike. I understand that the contractor will have to put in a steam shovel and dump cars in order to complete the dike. The work on either side is practically completed.

The condition of the contract from Chicot to Arkansas City is that but little work could be accomplished on it, and it remains to be done during the coming season. All of the sawdust pile at the Boston Mill is being removed, and a levee of sufficient grade and section built along this stretch, the mill now being abandoned.

The spur levee at Leland has been extended about one-half a mile, and its end protected by rip-rap of rock and mattresses of rock. This spur, since your Board built it, has been enlarged twice by the United States Government, and is now of such grade and section as to be reasonably secure for all time.

New Levees.

Serious conditions exist at points along the Chicot Front at three places, to-wit: Panther Forest, Whiskey Chute or Vaucluse, and Grand Lake. To this might be added a slow but continuous caving at Gaines' Landing and some recession at the lower line of Arkansas City below the Lacey & Kimball mills. At the latter places, however, the changes are slow, and the lines are safe for quite a little while. I cannot say the same as to conditions at the three places first mentioned.

The situation at Vaucluse is the most acute. It will be necessary to build there either a very high dike across the insecure foundation upon which the present Whiskey Chute Dike is built, and which, by the way, gave a great deal of trouble, when built, owing to its sinking foundation, or the alternative of going around Lake Chicot, which would meet with determined opposition and probable legal difficulties by the citizens of Arkansas. It is, therefore, incumbent upon you to meet the Mississippi River Commission at some point along its route, on the trip which it will shortly make down the river, and discuss with that body the placing of revetment at Vaucluse at once.

The situation at Panther Forest, while not quite so serious, is still one of great moment, as the upper end of the Panther Forest short line has been approached so closely by the caving bank that a new levee covering the upper end has been constructed during the past year by the United States Government, and at the present rate of caving this new line will not last for many years. If a line of levee is to be constructed at this point, it should be begun at an early date, so as to be prosecuted with the necessary vigor for its completion in two or three years. Owing to the difficulties of construction, such a line would probably have to be let at a very high price, and means will have to be provided by some one for its construction.

The caving bank at Grand Lake has not improved, while the new levee constructed by the United States last year is still a considerable distance from the river, the rate of caving has materially increased at the lower end of Matthews Bend, and it has every appearance at present of an angry and rapidly caving bank, which was not the case some few years ago. The rate of caving in this bend is now about 350 feet a year, against about 50 feet a year several years ago.

During the past year the Government extended the revetment at Red Fork, on the Arkansas River, about 1,000 feet, thereby protecting

the salient point at the foot of Lake Belcoe. This will relieve the serious situation which was threatened there, as the Government, in addition to placing this revetment, is constructing a levee line about 6,000 feet in length, running from the lower end of Lake Belcoe to a distance of about 2,200 feet below Red Fork, in behind the village of Red Fork, of which about 50 per cent. is completed.

Owing to the fact that your Board contributed towards the cost of building the Sandy Bayou and Cypress Slough Dikes, I have visited these localities several times. Both of these places are now closed, although the dikes have not yet been completed in accordance with the notes issued. The work is still progressing, and I hope to close this matter out before the next meeting of your Board.

It is too early yet to consider what work your Board may be called upon to do during the coming season, and in view of the serious conditions existing at the points mentioned, it would be the far better policy to await developments and the allotments of the Mississippi River Commission, after which I will take up with your Board the matter of a project for the coming sason. It may be said, however, that there is already in sight sufficient work to require all the revenues which it may be possible for your Board to raise.

Very respectfully,

M. P. ROBERTSON,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., APRIL 2, 1908.

Hon. J. T. McClellan, President, and Members Board of Commissioners, Fifth Louisiana Levee District, Tallulah, Madison Parish, La.:

GENTLEMEN—I have the honor to submit for your consideration the following report on the condition and requirements of the levee line in the Fifth Louisiana Levee District, with some general remarks as to the condition of banks, and bank protection work undertaken by the United States Government.

Up to this date there has been, this season, but little over a bank-full stage in the Mississippi River, but the water has been against the larger dikes in the district, such as Hollybrook, Reid, Kempe and others since the latter part of February. There has, therefore, been no apprehension as to the safety of the levee line.

The general condition of the entire line is excellent; all weeds

were cleared last year, and the levees are at present covered with a thick growth of Bermuda grass, and less abuse than usual from hog rooting can be noted. Some few new levees are rain and wave washed, such as Morancy, and L'Argent; but, as a whole, the condition of the levee line is better than it has ever been before. Many of the lower stretches in the district have been raised, or are under contract for enlargement, to a four-foot grade in the U. S. Third District, and to the approved Mississippi River Commission Grade in the Fourth U. S. District.

The State and District have now under contract and incompleted about 470,743 cubic yards of earthwork, estimated to cost, when completed, about $106,101.73. Up to this time, this season, it has not been necessary for the District to expend any money in high water protection work, but further rises may reasonably be expected during the month of April.

At the request of the President of your Board, this Board recently prepared a statement of the number of cubic yards required to place the levee line in the Fifth Louisiana Levee District, up to a four-foot grade from the Arkansas-Louisiana line to opposite Warrenton, Miss., and to the Mississippi River Commission approved grade from opposite Warrenton, Miss., to the lower end of the District, and to construct such new levees as may be required within the next two or three years, to the same grade, with crown 10 feet wide and slopes of 3 and 3 to 1. This estimate aggregated 10,000,000 cubis yards, which, at 25 cents per cubic yard, would cost approximately $2,500,000.

This shows that the Fifth Louisiana Levee District has still a vast amount of work to do before its levee line can be completed to the grade and section designed for it. In fact, even with the combined efforts of the United States, State and District authorities, it will be many years before this much to be desired goal can be reached. Moreover, conditions may develop necessitating the construction of long lines of new levees, in addition to those included in the estimate referred to, provision for which would have to be made.

It has been stated by engineers of experience and ability that between Greenville, Miss., and the mouth of Red River a greater amount of caving occurs than in any other stretch of the river. That part of the Mississippi River north of Vicksburg is known to steamboatmen as "The Bends," which is self-explanatory. The caving banks along the Fifth Louisiana Levee District make it a source of constant apprehension as to what will go next, and in the past it

has been a question of, not what would be ultimately necessary, but where would be the next long line of levee to be built. It is generally recognized that the greatest amount of caving occurs at the upper end of bends at low water, and at the lower end in high water. The rate of caving in years has hardly ever been less than 400 feet a year—not 400 feet in length, but 400 feet from the river back into the country. Among those points which have given the greatest amount of trouble in the past, due to caving banks, are: Elton, Salem, Henderson to Cabin Teele, Duckport, Reid, Diamond Island, Killie Krankie, Point Pleasant, Hard Times, Bondurant, St. Joseph to Harper's Bayou, L'Argent, Marengo, White Hall, Green, Forest Home, Glasscock, Bougere and Point Breeze. All of these points have been constant sources of anxiety and attention by the levee authorities during the past four years, and will continue to be for all time to come, unless a radical change in the channel shall cause a different situation to exist.

The construction of two or three new levees will be required this year, one at Hard Times, one at the upper end of Biggs, and possibly one at Greens.

The Hard Times Levee has been provided for by the United States Government and, I understand, will be let very shortly. The levee line located there by the Government is the last stand, and is situated above the St. Joseph Dike, and wings in at the upper end of the dike. It will take care of the situation there for two or three years, and by that time it is to be hoped that the United States Government will protect this large dike by revetment.

Condition of the Levees.

Ashton to Pilchers Point (0-256).—Work under contract by State, about 2 miles of enlargement completed, about 3 miles remaining to be done. When completed, this levee, although some 300,000 cubic yards will have been placed on it, will still be deficient in land side section.

Bunches Bend (256-755).—In excellent condition, but deficient in section on river side.

Opossum Point to Wilson Point (755-957).—In good condition as to section, but many sand boils are evident at the lower end. A very great increase in section is desirable.

Cottonwood to Elton (957-1348).—Good grade and section either

exists or is provided for under outstanding contracts in this entire stretch.

Elton (1348-1420).—Deficient in grade, section good.

Elton to Maguire (1420-1539).—Up to Commission Grade, but badly abused by travel, paths, crossings, etc.

Maguire to Hollybrook (1539-1808+90).—Under contract to four-foot grade, when completed will be deficient in section on land side.

Hollybrook New Levee (1808+90-1860).—Good grade and section. Up to Commission Grade.

Point Lookout (1860-2210).—Partially deficient in land side section. Enlargement required.

Point Lookout to Atherton (2110 -2280.—Deficient in section. Section partly all right, lower end deficient in slope land side.

Alsatia (2280-2368).—Good section, but deficient in grade.

Alsatia to Illawara (2368-2497).—Good in grade and section.

Willow Point Loop (2497-2715).—Enlargement just completed to sufficient grade and section.

Henderson (2715-2840).—Good section and grade.

Villa Vista (2840-3495).—This entire stretch of levee is deficient both in grade and section. It has been topped to a grade about 2½ feet above '97 water. It is the longest stretch in the district deficient in grade and section.

Cabin Teele to Delta (3495-4200).—Grade and section, while not up to standard, is very good, and this line could stand among the last of those to be improved.

Delta to Bedfords (4200-4615).—General condition of section good. Some short stretches deficient in grade.

Bedford New Levee (0-147).—Up to approved grade and section.

Christmas (147-259).—This levee is deficient in grade and section, and, owing to the proximity of the old bank of river, is leaky and practically requires re-construction. As I understand, this levee is among the oldest in the district, having been built in 1837, and improved in 1896.

Diamond Island (259-433).—Good section, but low grade.

Roundaway to Perkins (433-1180).—Improved under State contracts to sufficient grade and section.

Perkins (960-1582).—Deficient in grade and section. Has not been worked on since 1896. Government will let contract for the improvement of this stretch during the coming season.

Perkins to St. Joseph (1582-1900).—Sufficient in grade and section.

Hard Times to Evergreen-Bondurant (1900-1902).—Deficient in grade and section. Levee covered with vines and should be improved.

U. S. Evergreen-Bondurant (1992-2297).—Good section and grade, except about 2 miles of the upper end, which is topped with 6-foot crown and 2 and 2 to 1 slopes.

Bondurant to Kempe (2297-2951).—This entire stretch, which includes the town of St. Joseph, is generally up to Commission Grade, and, with the exception of some rain wash, is in generally good condition.

Kempe (2951-3115).—Levee well sodded, but deficient both in grade and section, with the exception of a short stretch of new levee constructed by Dameron & White.

Stockridge to Aquasco (3115-3416).—Good grade and section. Some parts are worn by stock paths, and travel on land side slope near the town of Waterproof. Otherwise well sodded and free from weeds.

Aquasco (3416-3581).—Deficient in grade. Slopes generally good. Levee open to public pasture.

Aquasco to Lake Concordia (3581-3941).—Good in grade and section. Some travel across levee, stock paths, etc., otherwise in good condition.

Lake Concordia (3941-3603).—Levee enlarged to Commission Grade in places. Badly abused by crossings, paths, etc. Scattered stretches of wave wash.

Sycamore to Vidalia (4603-5132).—Levee deficient in grade and section. Road too near base of levee, and built of sandy loam. Considerable sipage occurs in this stretch during high water. Levee should be improved and road moved further back.

Vidalia Front (5132-5202).—Up to Commission Grade. Path worn, but well sodded. Deficient crossing at Ferry.

Arnauldia to Moro (5202-5720).—Deficient in grade. Levee wave washed on Scotland Front. This is a very small levee, and the water does not stand against it very long during the spring rise.

Moro to Green (5720-6041).—Good grade and section. Well sodded and greatly improved by the cutting of timber from the river side berme.

Green to Fairview (6041-6479).—Long stretches of low grade levees in this stretch have been placed under contract by the United States Government recently, and will be improved to good grade and

section. Two new levees will probably be needed in the near future in this stretch. One at Green and the other at Fairview.

Fairview (6479-6644).—Up to Commission Grade and full section. Well sodded and will not need improvement for many years t ocome.

Union Point to Point Breeze.—62,150 feet built up to grade 1, 2 and 3 feet above '97 water. Except for wear and tear, and small paths, the levee in the lower part of the district is well sodded and looks well.

Before concluding my remarks in regard to the condition of the levees, there are some details in connection therewith which should be known:

First: The work undertaken at Point Lookout to prevent the scouring of the pits. At this point a long spur extends out about two miles to the river. This spur has been breached for many years, about 400 feet from the levee. During the high waters of 1903 and 1907, a continuous discharge of water through the gap in the old spur has caused a large "blue hole" to develop, and this "blue hole" has extended to the land side, causing a much stronger draft of current through it, scouring the pits considerably, and in some places cutting into the slope of the levee on the river side. To counteract this temporarily, two timber spurs, about 100 feet long, weighted with sacks of earth, were placed across the pits, to act as a traverse. They will probably fill their mission until after the recession of the present water, when an earthen spur will be built to prevent further scouring of the pits.

Four sloughs in the levees—two in the U. S. Biggs Levee, one in Reid and one at Kempe—have been repaired by removing the earth and replacing other material. So far these places are holding well.

1,400 feet of plank revetment work was constructed in front of the town of Vidalia, in accordance with plans and specifications furnished by the Board of State Engineers, the district furnishing the lumber and the town of Vidalia doing the work. This revetment was completed in a thoroughly workmanlike manner, and is now serving its purpose.

The new Moraney Levee, built by the convicts during the last season, has shown a great deal of shrinkage, owing to the fact that it was constructed during a very dry season. It is barely up to net grade. There is no cause for apprehension, however, as the levee is not showing signs of weakness.

REVETMENTS.

Numerous revetments have been constructed by the Government in front of the Fifth Louisiana Levee District, to-wit: at Elton or Providence Reach, Delta Point, Reid, Bondurant, Kempe and Giles Bend, all of which have been maintained and extended by the Government under an annual appropriation by the Mississippi River Comsission. The most acute situation to-day exists at Reid Bend, where no work has been done for a year by the United States Government, owing to the scarcity of plant, and only a small amount of revetment has been placed in position, and none at all during the past year. It is much to be regretted that no work was done in Reid Bend, as at the present time this bend presents the most acute situation of any bend in the front of the Fifth District, and there is danger of the current of the river flanking the revetment, or, in other words, going shorewards and leaving the revetment in the middle of the river. This is no criticism upon the National Government, but is due to the fact that other important works occupied the attention of the U. S. Engineers and their assistants above Reid, and they were not able to reach Reid during the past year, by reason of the scarcity of plant and boats.

The following resume of projects for bank protection work undertaken during the past season by the U. S. Government along the Fifth Louisiana Levee Disttrict will, I think, prove of interest.

Bondurant Chute.—Repairs were made to the upper bank pavement and the revetment extended down stream 1,000 feet, making the total length of the revetment in the chute 3,440 feet. This completes all the work contemplated in this locality under the present project.

Kempe Bend.—Extensive repairs were made to the revetment, principally at the lower end, where a cave destroyed about 800 feet of the work in September, 1906; the revetment was extended up stream 230 feet, and 4,950 feet of connecting mattresses placed between sections 1 and 12, bringing the mattress work up to or above the 10-foot stage on the Vicksburg gauge. The present length of revetment in Kempe Bend is 10,871 feet.

Giles Bend.—Extensive repairs were made to the revetment, principally at spurs 14 and 15, and between sections 28 and 30, the revetment was extended 2,220 feet, and now covers 20,328 feet of bank in two detached pieces—upper 8,192 feet, and lower 12,136 feet.

Natchez Front.—This work was commenced in August, 1907, and

during the season a total of 2,550 feet of bank was protected below low water with mattresses 300 feet wide, and with rock pavement above the low water, where upper bank protection was considered necessary.

In addition to these revetments, the following important point should be looked after by the Government Panther Forest, Vaucluse and Grand Lake in Arkansas, Hard Times and Marengo Bend in Louisiana. At all of these points caving is active and revetment will be required. Of the points mentioned, the situation at Vaucluse is the most acute, at this time. Continued caving at the upper end of the dike, across Whiskey Chute, has maintained for the last several seasons, and the rate of caving is sufficient to breach the controlling line of levee in about two years. There is an insecure foundation upon which to construct a dike across the chute, and the alternative of going around the lake would be disastrous to private interests and would meet with the vigorous opposition of the citizens of Arkansas.

The exact amount and character of revetment required at these points are matters for the United States Engineers to determine.

In the reports of the Board of State Engineers for the past several years, numerous remarks have been made about the Bougere Levee. It has been agreed within the past four years that, in consideration of the United States Government undertaking the construction of a line of levee seven miles in length, averaging 20 feet in height, and involving an expenditure aggregating about $480,000, necessary to close the Bougere Gap, the State and the District would care for all that line of existing levee between Vicksburg and the mouth of Red River. Both of these agreements have been carried out, the State and District have built all new levees and done all repair work necessary between Vicksburg and the mouth of Red River, and the United States Government has let and constructed all but 2.5 miles of the levee required to close Bougere Gap. Had this proposition been submitted to any one of these authorities as a whole proposition—that is, taking care of the existing levee line from Fairview to the mouth of Red River, and the construction of the necessary line to close Bougere, it would have been too large a proposition to have been undertaken by any one of these authorities. There remains only about 400,000 cubic yards to be placed in position to complete the Bougere Levee, and when this will have been completed, the levee authorities will have extended their levee line more than 30 miles, and protected the valuable country lying between it and Black River, in Catahoula, Concordia and Tensas Parishes.

The writer recently made a trip down the Ouachita River, from Monroe to the mouth, and found that with the lands lying along the Mississippi River practically overflowed by the present stage of water, the people on Black River have from 3 to 10 feet of bank still out, and their back lands free of water. Upon a close investigation among the citizens of that country, it was ascertained that the closure of Bougere has affected the country, by giving say 5 feet less of water than was formerly the case at the same stage of water in the Mississippi River, on Black River due west of Bougere.

The citizens of Iberville, Pointe Coupee, St. Matrin, Iberia, St. Landry, Avoyelles, Catahoula, Concordia, and Tensas Parishes are looking forward to the time when the locks at Bayou Plaquemine shall be opened, Bougere closed, and the Red and Atchafalaya Rivers divorced from the Mississippi. In fact, there are many other parishes that will be directly or indirectly affected by this closure, and a majority of those who run steamboats in the Red, Ouachita and Little Rivers, either from the Port of New Orleans or Natchez, look with favor upon the time when the flood waters of the Mississippi River shall be excluded from backing up these tributaries or going down the Atchafalaya River. The value to the State of Louisiana of such a condition would be inestimable. Plantations that now are deserted and grown up with trees would be reopened, land values would rise and industries would spring up, which the boatmen appreciate will be of more value to them than the mere fact of navigating from Old River to Barbre's Landing, as is now the case.

The temporary closure so far this year of Bougere has been brought about by the connection of the United States levee with the Texas and Pacific Railroad embankment, and the construction by that company of an earthen embankment across a 4,000-foot trestle, with crown 15 feet wide, and slopes of 3 and 3 to 1. This embankment is holding out so far the flood waters of the Mississippi River, which are to-day at a more than bankfull stage.

In conclusion, I desire to state that the close attention and intelligent supervision given to the levees of your district by your President, during the past few years, has resulted in a marked improvement in their condition, and the value of his services, both in advice and cooperation, cannot be computed.

Very respectfully,

THE BAORD OF STATE ENGINEERS,

Per M. P. ROBERTSON,

Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., March 27, 1908.

Estimate of cubic yards required to place levee line in the Fifth Louisiana Levee District to Mississippi River Commission Grade, with crown 10 feet, slopes 3 and 3 to 1. (Grade 4 feet above H. W. from Arkansas-Louisiana line to opposite Warrenton.)

U. S. UPPER TENSAS.

Name of Levee.	Length. Linear feet.	Cubic Yards.	Remarks.
Ashton to Pilcher's Point.			
0-256	25,600	300,000	
Bunches Bend			
256-505	49,900	.....	4 Feet and over above high water, 8' crown, slopes 3 and 3 to 1.
O'Possum Pt. to Wilson Pt.			
755-898	14,300	100,000	
Wilson's			
898-957	5,900	60,000	
Cottonwood			
95.-1140=1127	18,300	130,000	
Longwood			
1262-1296=1294	3,400	35,000	
Elton			
1294-1365=1348	7,100	75,000	
1348-1420	7,200	80,000	
Maguire to Hollybrook			
1539-1808+90	26,990	280,000	Under contract
Pt. Lookout to Atherton, N. L.			
1976-2110	13,400	130,000	
Atherton to Wilton Landing			
2143-2280	13,700	115,000	
Alsatia			
2280-2368	8,800	80,000	
Alsatia to Illawara			
2368-2497	12,900	95,000	
Henderson			
2715-2840	10,500	75,000	
Villa Vista			
2840-3014	17,400	160,000	
Mascot			
3014-3045	3,100	35,000	
3045-3135	9,000	90,000	
Buckhorn			
3135-3215	8,000	80,000	
Rosehill			
3215-3277	6,200	60,000	
Morancy			
3277-3328	7,800	55,000	
Milliken's Bend			
3328-3495	16,700	145,000	

Name of Levee.	Length. Linear feet.	Cubic Yards.	Remarks.
Cabin Teele			
3495-3511	1,600	15,000	.....
3511-3550	3,900	15,000	.....
Cabin Teele to Sparta			
3586-3680	9,400	35,000	.....
Sparta to Duckport			
3680-3781	10,390	55,000	.....
Nebraska to Killarney			
3781-3915	13,400	100,000	.....
Killarney			
3915-4002	8,700	38,000	.....
Delta			
4070-4200	13,000	70,000	.....
Delta Front			
4200-4290	9,000	50,000	.....
Delta to Martin			
4290-4384	9,400	80,000	.....
Martin-Biggs			
4384-4454=4453	7,000	65,000	.....
U. S. Biggs			
4453-4543=4524	9,000	95,000	.....
Biggs to Bedford			Levee only capped
4524-4615	9,100	150,000	to grade. Deficient in section.
Total		2,948,000	.....

U. S. LOWER TENSAS DISTRICT.

Bedford to Diamond Island			Based on original "Provisional Grade" adopted by Mississippi River Commission from opposite Warrenton, Miss., to mouth of Red River.
147-259	11,200	115,000	
Diamond Island to Roundaway			
259-433	17,400	165,000	.....
Perkins to Buckridge			
980-1180	20,000	225,000	.....
Buckridge to Burns			
1180-1267	8,700	65,000	.....
Point Pleasant			
1267-1345	7,800	65,000	.....
Buckridge			
1345-1470	12,500	100,000	.....
Elkridge			
1470-1582	11,200	140,000	.....
Lake St. Joseph			
1896-1900	1,400	30,000	.....
Hardtimes to Evergreen			
1900-1992	9,200	80,000	.....
Evergreen-Bondurant			
1992-2131	13,900	120,000	Deficient in section
Claggett			
2297-2362	6,340	50,000	.....

Name of Levee.	Length. Linear feet.	Cubic Yards.	Remarks.
Claggett-St. Joseph			
2362-2500	13,800	130,000	
St. Joseph to Cottage Home			
2540-2618	7,800	65,000	
Villa Clara			
2770-2815	4,500	35,000	
Harper			
2874-2951	7,400	60,000	
Kempe			
2951-2981	3,000	42,000	
2981-3035	5,700	70,000	
Goldman			
3035-3115	8,000	70,000	
Stockbridge			
3115-3166	4,100	35,000	
Hedgeland			
3166-3285	11,400	75,000	
Myrtle Grove			
3285-3352	6,700	70,000	
Waterproof			
3352-3416	6,400	65,000	
Aquasco			
3526-3581	5,500	60,000	
Lake Concordia			
3941-4283	34,100	330,000	
4338-4371	3,300	38,000	
4414-4520	10,600	125,000	
4520-4570	5,000	70,000	
4581-4603	2,200	45,000	
Sycamore			
4664-4752	8,000	60,000	
Minorca			
4853-5132	27,900	280,000	
Arnauldia			
5202-5287	8,500	50,000	
White Hall			
5287-5394	10,700	115,000	
White Hall to Moro			
5394-5665	27,100	140,000	
Moro			
5665-5720	4,300	35,000	
Moro to Warnicut			
5720-5806	8,600	58,000	
Green			
6041-6142	10,675	85,000	
Deer Park			
6142-6187	4,500	36,000	
Forest Home-Fish Pond			
6187-6294—6271	10,700	75,000	
Fish Pond-Ashley			
6271-6401—6380	13,000	126,000	

Name of Levee.	Length. Linear feet.	Cubic Yards.	Remarks.
Glasscock 6380-6463	8,300	105,000	
Glasscock-Fairview 6479-6588	10,900	140,000	
Fairview 6588-6644	4,200	42,000	
Lower Concordia from Union Pt. to Pt. Breeze	62,150	500,000	
Total U. S. Lower Tensas		4,387,000	
Extension of system from Pt. Breeze to mouth of Red River		500,000	

Estimate of approximate number of cubic yards required for new levees necessary in the Fifth Louisiana Levee District. Based on Grade 4 feet above the high water from Arkansas-Louisiana line to opposite Warrenton, Miss., and original "provisional Grade" adopted by the Mississippi River Commission from opposite Warrenton, Miss., to mouth of Red River.

U. S. UPPER TENSAS DISTRICT.

Name of Levee.	Length. Linear feet.	Cubic Yards.	Remarks.
	New levees required this year.		
Upper Biggs	5,000	310,000	
	New levees probably necessary within the next two years.		
Atherton	5,000	175,000	
Mascot	9,300	400,000	
Morancy	8,200	200,000	
Utz	4,000	130,000	
		905,000	

U. S. LOWER TENSAS DISTRICT.

Name of Levee.	Length. Linear feet.	Cubic Yards.	Remarks.
	New levees required this year		
Upper Sycamore	5,200	200,000	
Upper Green	2,600	100,000	
Fairview	12,000	375,000	
		675,000	
	New levees probably necessary within the next two years.		
Palo Alto	4,500	180,000	

RECAPITULATION.

	Cubic Yards.	Cubic Yards
Enlargement—		
U. S. Upper Tensas District.....	2,948,000	
U. S. Lower Tensas District.....	4,387,000	
		7,335,000
New levees necessary this year—		
U. S. Upper Tensas District.....	310,000	
U. S. Lower Tensas District.....	675,000	
		985,000
New levees necessary within next two years—		
U. S. Upper Tensas District.....	905,000	
U. S. Lower Tensas District.....	180,000	
		1,085,000
Extension of system from Point Breeze to the mouth of Red River.....		500,000
Total		9,905,000

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 11, 1908.

To the Honorable President and Members of the Board of Commissioners, Atchafalaya Basin Levee District, Port Allen, La.:

GENTLEMEN—On the occasion of your regular meeting, to be held on Monday, January 13, I desire to submit to you a report on the two projects for levee extension which have been under investigation since your last meeting.

REPORT ON THE PROTECTION OF THE WEST BANK OF THE ATCHAFALAYA RIVER, IN THE PARISHES OF ST. MARTIN, IBERIA AND ST. MARY.

The residents of the west bank of the Atchafalaya River, south of the northern boundary of St. Martin Parish, have complained that of late years the territory east of the Teche has been overflowed more deeply and for a longer priod of time than was customary in the past. The cause ascribed by the residents for this is the elevation of the flood stage in the lower Atchafalaya, due to the extension of the levees on both banks of the river. These residents of your district desire protection from this overflow.

I am inclined to agree with them that the lower Atchafalaya now reaches a higher flood level, owing to the confinement of the flood discharge by the extension of the levee lines on both sides of the river, and it would seem that the claim of the residents of that portion of your district is well founded, and that they should be entitled to protection from overflow.

To give this protection, however, is a difficult matter. The limit of your district runs east and west along the northern boundary of St. Martin Parish. This is an absolutely arbitrary line, which has no regard to the general topography of the country. If levees were built on the west bank of the Atchafalaya River, beginning from the northern boundary of St. Martin down to the mouth of the Teche, very little protection would be afforded to that country, as the water would enter into your district across the northern boundary of St. Martin, and would overflow the territory, even more than is now the case, back of such a levee line. If another additional line were built along the northern boundary of St. Martin, running east and west, and thereby isolating your district from the parishes above it, the enclosing of that part of your district would be accomplished. Examination, however, has revealed that such a levee line running east and west along the northern boundary of St. Martin, or anywhere in that vicinity, is absolutely impracticable of construction.

In my estimation, there are only two solutions to the problem. The first solution will require legislation both on the part of the State and Federal Governments, and the second will require legislation on the part of the State Government alone.

The first solution would be to build a continuous levee line on the west bank of the Atchafalaya River, from the point where the levee now ends, somewhere near the town of Latanier, all the way down to the mouth of the Teche, diking all bayous encountered and also closing Bayou Courtableau. In that way the entire west bank of the Atchafalaya would be absolutely protected from overflow by the Atchafalaya River. In order to do this it would probably be necessary to obtain from the Federal Government authority to close the mouth of Bayou Courtableau, and it would also in all probability be necessary to add to the Atchafalaya Basin Levee District the territory lying between the northern boundary of the Parish of St. Martin and Bayou Courtableau. In connection with this project it would become necessary to provide an outlet for the rain water and drainage coming down Bayou Boeuf and of all the territory north of Bayou Courtableau. This could be done by opening an arttificial channel about 7 miles long between Port Barre and the head of Bayou Teche, thereby pouring all of the drainage of that territory into and down Bayou Teche to its mouth into the Atchafalaya River near Morgan City. This diversion of drainage would cause Bayou Teche to become a running stream, which would prove highly desirable. I believe that this project, although very expensive, would be

the most acceptable one, and the one which would give the most satisfaction. Should this, however, prove impracticable, then there is a second solution still left.

The second solution would be to build a levee line along the southern bank of Bayou Courtableau as high as Port Barre, or as high as Washington, if it were necessary. In following the southern bank of Bayou Courtableau, it would become necessary to close by dikes the various bayous which open from the Courtableau and flow southward. When the Atchafalaya River were reached, the levee line would continue on the west bank of the Atchafalaya River, on a carefully selected location, closing all bayous and extending down as far as necessary, even down to the mouth of the Teche, if found desirable. This would be a comprehensive and practicable system of levee. In order to accomplish this it would be necessary to have the territory lying between the Courtableau and the northern boundary of St. Martin included within the limits of the Atchafalaya Basin Levee District, as this territory at present (which forms the Coutableau District) does not possess sufficient revenues to pay for the levee line within its limits.

Both of the above projects are extensive and expensive ones. The first object would involve the construction of some 70 miles of levee on the west bank of the Atchafalaya River south of Bayou Courtableau, and the digging of some seven miles of canal to connect Bayou Boeuf with the head of Bayou Teche. In addition to the seventy miles of levee above mentioned, about eight miles more of levee would have to be completed by the Red River, Atchafalaya and Bayou Boeuf Levee District to connect the present end of its system with Bayou Coutableau. This work is in contemplation.

Project No. 2 would contemplate the building of the above seventy miles of levee, and in addition thereto about twenty miles of levee on the south bank of Bayou Courtableau, between Washington and the Atchafalaya River. This second solution, however, would not render necessary the digging of the artificial waterway between Port Barre and the head of Bayou Teche.

The above remarks, to my mind, cover fully the question under consideration relative to the protection of the west bank of the Atchafalaya River in your District, and after a thorough investigation of the territory, both on the ground and from such maps as are on record, I find that any other project for the protection of that country is impracticable.

Report on the Protection of the East Bank of the Atchafalaya by Extending the Levee System South of Bayou Sherman.

There has been a demand made of late by the residents of the east bank of the Atchafalaya, and of the banks of Bayou Maringouin, Bayou Gross Tete and Bayou Fordoche, for additional protection on the part of your Board. The raising of the flood level of the lower Atchafalaya, referred to above, also affects the residents of the east bank, and the demand is made that additional protection be given to them. This request is as just as that of the residents of the west bank of the Atchafalaya River, and within the last two or three months the matter has been thorougly investigated by visits on the ground and by several conferences with the parties interested. After having given the matter considerable thought and investigation, it would seem that it might be practicable to protect to a considerable extent the east bank of the Atchafalaya River by extending the line southward, probably as far as the mouth of Bayou Maringouin, a distance of about 30 miles. As to the location of this line, there exists some difference of opinion. After a thorough investigation of the subject matter, I am of the opinion that the levee line should follow the east bank of Bayou Alabama, crossing Bayou Close, Sterling Bayou and other bayous, thence following the east bank of Big Bayou des Glaizes until a point is reached in the vicinity of Whiskey Bay, and then following the northern bank of Whiskey Bay and Grand River to some suitable point near the mouth of Bayou Maringouin. This line, which would take quite a little while to build, and large expense, would gradually, as it were constructed, extend the protection from overflow further south. It would also close, one by one, the existing mouth of Bayous which serve to drain the territory east of the Atchafalaya, and deflect this drainage to those bayous and depressions which are further to the south. It would ultimately be necessary to help out this drainage by opening sloughs and bayous in the interior towards the lower end of the proposed system.

Another project, however, which is recommended and which meets with favor at the hands of many of the residents, is to follow the east bank of Bayou Alabama until some suitable point is reached, then to cross Bayou Alabama and meander with the levee line along high ridges crossing many of the interior bayous, such as Johnson Bayou, Big Sandy Bayou, and others, and bringing the levee line finally along the east bank of Bayou des Ourses and Cane Bayou

to the northern extremity of Whiskey Bay. The line could then be continued along the northern boundary of Whiskey Bay, closing the mouth of Bayou des Glaizes, and extending on, as above outlined, to a point west of Bayou Maringouin. To my mind, this somewhat more difficult and arbitrarily located line would not give the same degree of protection to the country until it finally reached the southern extremity of Big Bayou des Glaizes, and by a dike located at that point, prevented the water from backing up into Bayou des Glaizes and its many tributaries, so as to overflow the territory situated east of said Bayou des Glaizes. The matter is, however, before you for discussion and settlement.

Very respectfully,

ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., July 1, 1907.

To the President and Members, Board of Commissioners, Pontchartrain Levee District, Convent, La.:

GENTLEMEN—The levee line which protects your district has received, within the past few years, such thought and consideration, that the present high water, which although not as high as that of 1897 or 1903, was of much longer duration, did not give any serious apprehension, nor at any time during this period did any development of danger present itself, from excessive sipage, wave-wash or crayfish holes through the levees.

In my opinion, the dearth of crayfish holes this season, as compared with former years of high water, was due in a great measure to the systematic method which you have adopted of draining the borrow pits, cleaning the levees, and digging sipage ditches in advance of the flood waters.

Whilst the construction of new levees and the enlargement of existing old levees, should continue, as in the past, to absorb the attention, efforts and resources of your district; the maintenance, supervision and care of same demand an equal attention and consideration, and regulations bearing on this subject from this time on should be enforced. With the view of bringing this matter to your attention, at this meeting, I have outlined a form of rules and regulations which I respectfully submit for your consideration.

It is absolutely necessary, in order to have access to the levees at all times, that the public highway should be located parallel to and along the rear of the land base of said levees. Thre are five stretches of levee in your district, namely: below Plaquemine Point, in Iberville Parish; below College Point, in St. James Parish; in front of the Montegut and Ory Plantations, in St. John Parish; and in the town of Kenner, Jefferson Parish, where the public highway does not skirt the levee. If the Police Juries of the Parishes in which these stretches of levee are situated cannot see their way clear to changing the location of the present road, to conform to the levee line, then it would be expedient and I believe advsiable, at this time, for your Board to build a berme or banquette of twenty feet wide along these levees in order to have access to these levees at all times.

At the recent meeting of the Mississippi River Commission, held in St. Louis, June 24th, 1907, I submitted a detailed statement of the condition of your levee line as it exists to-day, which I desire to transmit to you, at this time, for your information. From this statement, the summary in cubic yards of earthwork required is as follows: 1,013,000 cubic yards, of which proposals for the construction of 299,000 cubic yards are invited by the United States Government, to be opened July 10, 1907, leaving a balance of 714,000 cubic yards to be provided for.

The following statement, relative to work done in your district by the United States, from June 30, 1905, to June 30, 1906, was kindly furnished to me by Capt. J. F. McIndoe, Corps of Engineers, U. S. A., in charge of the Fourth District, Mississippi River Improvement:

AMOUNTS EXPENDED FROM JUNE 30, 1905, TO JUNE 30, 1906.

Levees.	Cubic Yards.	Cost.
Arizona, Sec. 6	13,103.66	$ 1,886.93
Dreyfous, Sec. 7	13,537.25	1,949.36
Southwood, 4-5-6-7	51,861.38	7,488.04
Linwood	79,773,76	13,162.67
Hermitage, Sec. 4	12,456.17	2,055.27
Oneida, 5-6-7	35,384.24	4,942.18
Belmont, 1-2-3	42,538.93	7,848.43
Hester, 1-2	25,021.41	4,616.46
Lutcher 1-2	29,443.87	1,913.84

AMOUNTS EXPENDED FROM JUNE 30, 1906, TO MAY 1, 1907.

Levees.	Cubic Yards.	Cost.
Cottage Farm	78,556.53	$12,961.83
Belle Helene	77,826.60	12,841.39
Bourbon, 3-4-5	35,390.04	5,839.36
Margaret, 1-2-3	34,796.74	4,664.02

SECTIONS OF ABOVE LEVEES YET TO BE COMPLETED.

Levees.	Cubic Yards.	Cost.
Hermitage, 1-2-3	34,513.01	$ 5,669.64
Bourbon, 1-2	24,814.48	4,094.39
Margaret, 4-5	23,428.11	3,865.55

CONTRACTS ENTERED INTO FROM JUNE 30, 1906, TO DATE.

Levees.	Cubic Yards.	Cost.
Gomez	19,418.89	$ 3,495.40
Burnside	18,644.18	3,052.98
Union	105,469.64	16,215.95
Sarpy	26,609.74	10,377.80
Pecan Grove	76,742.22	11,503.66
Lutcher Extension	6,137.67	911.45

The State, since my last report to you of April 20, 1906, has completed the Gypsy Point contractt, involving 240,561 cubic yards, at 13.95 cents per cubic yard, amounting to $33,558.25, and has under contract the Hope Levee, involving some 110,000 cubic yards, at 21.45 cents per cubic yard, amounting to approximately $23,600.00, on which no work has yet been done.

The District has outstanding incompleted contracts for the Victoria Levee, Parish of St. Charles, involving 54,257.3 cubic yards, at 21.40 cents per cubic yard, amounting to about $11,611.00, of which some 43,000 cubic yards have been certified up to date; for the Ormond Levee, in the Parish of St. Charles, involving 31,978.9 cubic yards, at a cost of 15 cents per cubic yard, amounting to $4,794.84, of which some 24,300 cubic yards have been certified to date, and on which levee work was resumed June 10, 1907; for the Albert Spies Levee, in the Parish of Jefferson, involving 101,000 cubic yards, at 23 cents per cubic yard, costing about $23,230.00, of which some 45,000 cubic yards have been certified up to date; and for the

Shrewsbury to Parish Line Levee, Parish of Jefferson, involving some 70,000 cubic yards, at 21 cents per cubic yard, amounting to about $14,700.00, of which some 31,000 cubic yards have been certified up to date.

In addition to the above contracts for earthwork, the district has built, under contract, some 65,644 feet B. M. at a cost of $2,297.54, for revetment of levees completed from Shrewsbury to Parish Line; and has expended, for drainage of borrow pits, under contract with W. E. Morgan, the following amounts:

Parish.	Cubic Yards.	Cost.
East Baton Rouge	8,189	$1,149.00
St. James	22,333	3,296.67
St. John	11,477	1,721.55
Totals	41,999	$6,167.22

The District has also spent the following amounts, under contracts entered into for cleaning the levees and cutting weeds, etc., during the summer of 1906, viz.:

East Baton Rouge Parish	$ 287.65
Iberville Parish	497.40
Ascension Parish	379.25
St. James Parish	382.30
St. John Parish	269.50
St. Charles Parish	347.88
Jefferson Parish	241.57
Total	$2,405.55

The State allotment for this year has not yet been apportioned by the Board of State Engineers, but it is presumed that your district will receive the same consideration as in the past.

The Mississippi River Commission allotments, approved by the Secretary of War, April 1, 1907, included an appropriation of $120,000.00 for the Pontchartrain Levee District.

Respectfully submitted,

SIDNEY F. LEWIS,
Assistant State Engineer.

Rules and Regulations Governing the Building of Ramps, Erection of Siphons, for Irrigation and Industrial Purposes, Across the Public Levee; and for Flooding the Battures; Suggested to the Pontchartrain Levee District for Adoption.

Specifications for Ramps.

First: For Ramps crossing the levee at right angles to the levee. The ramp should be built of earth, not less than one foot above the crown of the existing levee; with a slope towards the levee not steeper than ten (10) horizontal to one (1) vertical; width of roadway not less than sixteen (16) feet wide; with side slopes of two (2) horizontal to one (1) vertical on each side. The roadway should be surfaced with either cinders, broken stone, brick, or gravel, so as to prevent gullying from rain wash.

Second: For ramps ascending the levee along the slope of the levee: The ramp should be built of earth, with a slope ascending same of not less than ten (10) horizontal to one (1) vertical, crossing the levee at an elevation of one foot higher than the crown of the existing levee at the point of crossing; width of roadway not less than twenty (20) feet wide; with slope of one vertical to twenty horizontal from intersection of levee and ramp to outer edge of ramp; and slopes of two horizontal to one vertical from outer edge of ramp to natural surface of ground. At the line of intersection of ramp and levee, and at equal intervals, a row of substantial posts should be driven to protect land slope of levee from being cut into by vehicles.

Specifications for the Erection of Siphons.

All pipes or siphoons should conform to the cross-section or perimeter of the levee; the intake end of siphon or pipe should not be less than thirty (30) feet from the river base of said levee, and the discharge end twenty-seven feet from the land base of said levee. Such pipes or siphons, or their supports, must not at any time cut into the crown or slope of the levee. Where the pipes or siphons cross the crown of the levee, earthen approaches must be built. on either side of said pipes or siphons, flush with the top of the pipe and extending on each side of the centre of the pipe, a distance equal to four times the height of the top of the pipe above the crest of teh levee, thus providing inclines of easy access over such pipes of siphons. The prim-

ing pump, or any device for that purpose, connected with the top of such pipes or siphons, shall not be allowed to remain on the crown of the levee, but must be removed to either edge of the crown of the levee, so as not to interfere with the inspection of the levee.

These requirements with regard to providing approaches over pipes or siphons, must be carried out and completed on or before February 1, 1908.

Flooding of Battures.

As it is considered harmful to the levee system to permit the flooding of large areas of batture, and to have large ponds of water against the river base of the levees, at any stage of the river below the level of the battures, and in order to prevent this and to mitigate this evil, the following specifications are prescribed:

Whenever any planter desires to bring water from the surface of the Mississippi River through his pipe or siphon, when the level of the river is below the natural surface of the batture, by pumping, he shall be permitted to carry the water from the pump to the siphon intake by means of a surface canal leveed in on all three sides, and to be constructed not nearer than thirty (30) feet from the river base of the levee, and with a width between levees not greater than one hundred feet.

The levees built on either side of this surface canal shall be of sufficient strength to hold what water is carried from the pump to the siphon intake, and should they break at any time during the pumping season, so as to cause the flooding of a greater area of batture than prescribed, the pumps shall be stopped and the levees repaired.

This requirement is to become effective after the high water season of 1907.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., June 20, 1907.

Statement showing approximate elevation of levees above highest water in the Pontchartrain Levee District, also quantity of earthwork necessary to place said levee line to the Mississippi River Commission Grade, with crown 8 feet, slopes 3 and 3 to 1:

EAST BATON ROUGE PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Baton Rouge to Arlington				
0-134+64	13,464	4.0		
134+64-152	2,500	4.0	120,000	Caving bank from 134+64 to 151+63. New levee required.
Arlington				
152-204+78=201+49.	5,315	M.R.C.		
Arlington to Laurel				
201+49-249+15	4,766	3.0	34,000	
Laurel				
249+15-275	2,585	3.0	55,000	Washing bank. New levee required.
Laurel to Conrad				
275-325	5,000	3.0	35,000	
Conrad				
325-412	8,700	M.R.C.		
Martinez to Burtville				
412-691	27,900	2.5	170,000	
Woodstock				
691-740	4,900	M.R.C.		
Totals			414,000	

IBERVILLE PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Manchac to Billings 740-976	23,600	M.R.C.		
Billings 976-1040	6,400	3.0	40,000	
Folse 1040-1073+49	3,349	M.R.C.		
Gomez 1073+49-1104+25	3,076	M.R.C.		Under contract by U. S. 19,418.89 cubic yards, at a cost of $3,595.40. Nothing done.
Gomez to Golden Gate 104+25-1363+30	25,905	M.R.C.		
St. Gabriel 1363+30-1506+70	14,350	3.0	80,000	Advertised by U. S.
Matgaret 1506+70-1556+92	5,022	M.R.C.		Under contract by U. S. 34,796.74 cubic yards done at a cost of $4,464.02; 23,428.1 cubic yards yet to be done at a cost of $3,865.55
Virginia to Dreyfous 1557-2118+21	56,121	M.R.C.		
Dreyfous 2118+21-2132+70	1,449	M.R.C.	54,000	New levee advertised by U. S.
Dreyfous to Parish Line 2132+70-2147	1,430	M.R.C.		
Totals		.....	174,000	

ASCENSION PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Parish Line to Belle Helene 2147-2494	34,700	M.R.C.		
Willow Grove 2494-2507+21	1,321	3.5	15,000	
Gem 2507+21-2529+64	1,243	2.5	108,000	New levee advertised by U. S.
Gem to Burnside 2529+64-3019+55	48,992	M.R.C.		
Burnside 3019+56-3041	2,144	M.R.C.		Under contract by U. S. 18,644.18 cubic yards at cost of $3,052.98. Nothing done.
Burnside to Parish Line 3041-3140	9,900	M.R.C.		
Totals		.....	123,000	

ST. JAMES PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Union				
3140-3238+25	9,825	M.R.C.		Under contract by U. S. 105,469.64 cubic yards at a cost of $16,215.95. Work just begun.
St. Mary to Bourbon				
3238+25-4044	80,575	M.R.C.		
Bourbon				
4044-4110	6,600	M.R.C.		Under contract by U. S. 35,390.04 cubic yards done at cost of $5,839.36, and 28,814 cubic yards to be done.
Bourbon to Parish Line				
4110-4201	9,100	M.R.C.		
4201-4216	2,000	M.R.C.	40,000	New levee required.
4216-4358	14,200	M.R.C.		
		.....		
Totals			40,000	

ST. JOHN PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Parish line to New Hope				
4358-4442	8,400	M.R.C.		
New Hope				
4442-4467	2,500	M.R.C.		Undercontract by State. 25,200 cubic yards, at cost of $2,562. Nothing done.
Hope				
4467-4490	2,300	M.R.C.		New levee required, caving bank; under contract by State. 89,000 cubic yards at a cost of $22,250. Nothing done.
Hope to Bonnet Carre				
4490-5019	52,900	M.R.C.		
Bonnet Carre to Parish Line				
5019-5108	8,900	2.5	85,000	
5109-5142	3,400	M.R.C.		
		.....		
Totals			85,000	

ST. CHARLES PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Parish Line to Prospect 5142-5434	30,200	M.R.C.		Advertised by U. S.
Prospect 5434-5517	8,300	1.5	57,000	Under contract by U. S. 26,609.74 cubic yards, at a cost of $10,377.80. Just begun.
Sarpy 5517-5545	2,800	M.R.C.		
Victoria to Ormond 5545-5654	10,900	M.R.C.		Under contract by district; 86,235 cubic yards at a cost of $16,407.84; about two-thirds completed.
Red Church to Pecan Grove 5654-5735	8,100	M.R.C.		
Pecan Grove 5735-5832	9,700	M.R.C.		Under contract by U. S. 76,742.22 cubic yards at a cost of $11,503.66. Nothing done.
St. Rose to Almedia 5832-5961	12,900	M.R.C.		
Fairview 5961-6024	6,300	3.0	30,000	
Totals		.....	87,000	

JEFFERSON PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Parish line to Albert Spies 6024-6232	53,000	M.R.C.		
Albert Spies 6232-6257	2,764	M.R.C.		New levee under contract by district. Approximately 100,750 cubic yards at a cost of $23,172.02. 50 per cent completed.
Albert Spies to Macedonia Church 6257-6554	29,700	M.R.C.		
Macedonia to Deckbar 6544-6572+50	2,850	M.R.C.		Under contract by district, Shrewsbury to Parish Line.
Deckbar 6572+50-6584+55 ...	1,030	4.0	35,000	New levee required.
Southport 6584+55-6594+90 ...	1,030	4.0		Under contract by district. "Shrewsbury to Parish Line."
Southport Elevator Co. 6594+90-6608+56 ...	1,450	4.0	55,000	New levee required.
Elevator to Parish line 6608+56-6630	2,144	4.0		Under contract by district.
Totals		.....	90,000	

RECAPITULATION.

	Cubic Yards.
East Baton Rouge	414,000
Iberville Parish	174,000
Ascension Parish	123,000
St. James Parish	40,000
St. John Parish	85,000
St. Charles Parish	87,000
Jefferson Parish	90,000
Total	1,013,000
Of which proposals for the construction of 299,000 cubic yards are invited by the U. S. Government, to be received July 10, 1907.....	299,000
Leaving a balance to be provided for of.....	714,000

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., June 4, 1907.

To the Honorable President and Members of the Board of Commissioners for the Lafourche Basin Levee District, New Orleans, La.

GENTLEMEN: Owing to the unprecedented early rise of the river, all outstanding contracts by the United States, State and District, with the exception of the Jack Strange and Stevenson Levees, under contract by the State, were interfered with in December 1906 and have remained incompleted up to date.

Whilst the high water of 1907 did not reach that of 1897, the highest of record at Donaldsonville, by 2.3 feet at the upper end of the district, at the lower end of the district, about fifty miles below the City of New Orleans, it was nine-tenths of a foot higher than that of 1897, and within two-tenths of a foot of that of 1903, the highest water on record at that point in the river.

The water in the river covered the battures, was above the natural surface of the ground and well against the levees in Plaquemines Parish as early as December 1, 1906, and has continued so up to date, and from present river indications contractors will not be able to resume work for some time to come in that section of the district.

In the early part of December, 1906, the incompleted contracts were the source of much anxiety and it was only through persistent effort and hard work on the part of the constituted authorities that these levees were made secure against the waters of the approaching flood.

Notwithstanding the fact that all necessary vigilance and preventive measures were taken by those in authority, to avert disaster, the levee on the front of the Live Oak Plantation, 800 feet below the residence, in the Parish of Plaquemines, was breached between 9 and 10 p. m. on Thursday, February 21, 1907, when the river stood at its highest stage.

The Canal Street gauge at New Orleans read 19.8 from February 13 to 21, which was the highest reading recorded during this period of high water. The cause of this break was due to the enlargement of a crayfish hole through the embankment. The levee was of standard section, it stood over 2.5 feet above the water surface, and had been repaired and enlarged by the district in the season of 1904.

On March 5, 1907, when the Canal Street gauge read 16.5 the river having declined over 3.0 feet at New Orleans and was still receding above, a proposition by Mr. Theo. S. Wilkinson, planter, in

the Parish of Plaquemines, to close the Live Oak Crevasse for $20,000 was submitted and accepted by your Board. Work on the closure of this crevasse was begun on March 6, 1907, with the Canal Street gauge reading 16.1. During the early progress of the work the river continued to fall, on March 11, 1907, the Canal Street gauge reading 15.2, from that time on to April 10, 1907, it rose gradually until the Canal Street gauge read 17.2. The crevasse was virtually closed on March 23 1907, on a rising river, the gauge on Canal Street reading 15.8. The total cost of the work, including the closure of the crevasse and subsequent protection work to secure same against a rising river, amounted to $39,836.66.

I have compiled a detailed statement, which I desire to transmit at this time for your information, showing the condition of your levee line as it exists to-day, from which statement the summary in cubic yards of earthwork amounts to as follows:

	Cubic Yards.
For enlargement	612,400
For new levees	1,023,000
Total	1,635,400

The following statement, relative to work done in your district by the United States, from June 30, 1905, to May 1, 1907, has been kindly furnished to me by Captain J. F. McIndoe Corps of Engineers U. S. A.

Amounts expended from June 30, 1905, to June 30, 1906.

None.

Amounts expended from June 30, 1906, to May 1, 1907.

Parish.	Levee.	Contents.	Cost.
St. John	Gold Mine Sec. 2	16,612.30	$1,846.83
St. John	Waguespack	61,227.10	7,448.59

Incompleted contracts entered into from June 30, 1905, to June 30, 1906.

Parish.	Levee.	Contents.	Cost.
St. Charles	Columbia	76,000.00	$10,450.00
St. Charles	Waterford	102,775.90	11,747.29
St. Charles	Willswood	25,476.92	4,203.69

Amounts expended from June 30, 1906, to May 1, 1907.

Parish.	Levee.	Contents.	Cost.
Plaquemines	Oakville Section 5	12,575.73	$2,188.18
Plaquemines	Magnolia Sec. 5	13,282.07	2,350.92
Plaquemines	Socola Revetment		148.41

Sections of above levees yet to be completed.

Levee.	Contents.	Cost.
Oakville 1-4	52,721.52	$9,173.54
Magnolia 1-4	43,428.91	7,686.92

Contracts entered into from June 30, 1906, to date.

Levee.	Contents.	Cost.
Socola 1-2	29,595.44	$4,868.45

The State, since my last report to you of April 2, 1906, has completed the Jack Strange and Stevenson levees, involving 211,349 cubic yards at a cost of $40,050.63, and has an outstanding contract for "La Reussite" entered into August 1, 1905, involving about 55,000 cubic yards, costing about $9000., of which about 9,500 cubic yards had been placed in position when the work was interrupted by high water.

The district during the same period has completed the Star to La Reussite Levee involving 45,478 cubic yards, at a cost of $10,232.55, and has outstanding incompleted contracts for the construction of the Donaldsonville Front Levee, Ascension Parish, involving about 150,000 cubic yards, of which about 50,000 cubic yards had been placed in position when the work was interrupted by high water. Magnolia to Parish Line Levee, St. James Parish, on which no work has so far been done; Flagtown to Ashton Levee, St. Charles Parish, involving about 112,000 cubic yards, of which 85,468 cubic yards have been placed in position; and the Nine Mile Point Levee, Jefferson Parish, involving about 41,206 cubic yards, of which 12,273 had been placed in position when the work was interrupted by high water.

Respectfully submitted,

SIDNEY F. LEWIS,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., May 10, 1907.

Statement showing approximate elevation of levees above highest water in the Lafourche Levee District; also approximate quantity of earthwork required to place said line to the Mississippi River Commission Grade, above the Parish of Orleans; and to a grade 3 feet above the highest water (1903) in the Parish of Plaquemines, with crown 8 feet, slopes 3 and 3 to 1:

ASCENSION PARISH.

Name of Levee.	Linear feet.	Above H. W. feet.	Cubic Yards.	Remarks.
Donaldsonville Front...				
0 to 62.....	6,200	2.5	150,000	Under contract by District about one-third completed.
Peytavin to Parish line				
62-394	32,800	M.R.C.		
Totals	39,000	.....	150,000	

ST. JAMES PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Parish line to Lauderdale				
394-473	7,900	M.R.C.		
Lauderdale				
473-492	2,000	M.R.C.	60,000	Caving bank, new levee required.
492-577	8,500	M.R.C.		
St. Louis				
577-592	1,500	M.R.C.	50,000	Caving bank, new levee required.
592-1023	43,100	M.R.C.		
Richbend				
1023-1041	2,300	M.R.C.	96,000	Caving bank, new levee required.
Pike's Peak				
1041-1081	4,000	2.5	35,000	
Pike's Peak to Magnolia				
1081-1424	34,300	M.R.C.		
Magnolia to Parish Line				
1424-1528	10,400	2.0	60,000	Under contract by district. Nothing done. Work interrupted by high water.
Totals	114,000	.....	301,000	

ST. JOHN PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Parish line to Stevenson				
1528-1776	24,800	M.R.C.		
Stevenson to Bonsecours				
1776-1865	9,113	M.R.C.		State contract. Final certificate December 29, 1906, involving 211,349 cubic yards at 18.95, cost $40,050.63.
Bonsecours				
1865-1881	1,600	2.0	10,000	
Alliance				
1881-1937	5,600	M.R.C.		
Columbia				
1937-2065	12,800			Under contract by U. S. Nothing done.
Tigerville to Parish Line				
2065-2310	24,500	M.R.C.		
Totals	78,413	.....	10,000	

ST. CHARLES PARISH.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Hymelia to Waterford 2310-2470	16,000	M.R.C.		
Waterford 2470-2635	16,500			Under contract by U. S. Nothing done.
Pelican to Flagtown 2635-2774	14,400	M.R.C.		
Flagtown to Ashton 2774-2899	11,608		27,000	District contract, 8,870 feet completed to 2861, just below Sperenza sugar house, 85,468 cubic yards, at a cost of $17,448.85.
Ashton to Louisa 2899-3111	21,200	M.R.C.		
Louisa 3111-3152	4,100	2.5	20,000	
Roger Valle 3152-3166	1,610	M.R.C.		
Coopersville 3166-3193	2,700	2.5	15,000	
Coopersville to Parish Line 3193-3274	8,100	M.R.C.		
Totals	96,218	.....	62,000	

JEFFERSON PARISH.

Orange Grove to Willow Grove 3274-3463	18,900	M.R.C.		
Willswood 3463-3525	6,200	M.R.C.		Under contract by U. S.
Willow Grove 3525-3599	7,400	M.R.C.		
Upper Avondale 3599-3607	1,200	M.R.C.	32,000	New levee required.
Avondale 3607-3614	700	M.R.C.		
Lower Avondale 3614-3629	1,500	M.R.C.	40,000	New levee required.
Avondale to Nine Mile Point 3629-3810	18,100	M.R.C.		
Nine Mile Point 3810-3919	10,900		29,000	District contract involves 41,000 cubic yards, 12,000 cubic yards completed. Interrupted by high water.
Westwego 3919-3953	3,400	M.R.C.		
Company Canal 3953-3968	1,500	1.5	15,000	
Ames Crevasse to Southside 3968-4064	9,600	M.R.C.		
Amesville 4064-4092	2,800	1.0	20,000	
Marrero 4092-4102	1,000	M.R.C.		
Getzinger 4102-4136	3,400	2.0	30,000	
Beauregard 4136-4166	3,000	M.R.C.		
Harvey to McDonoghville 4166-4255	8,900	1.5	50,000	
McDonoghville 4255-4309	5,400	M.R.C.		
Texas Pacific Terminals 4309-4332	2,100	1.0	30,000	
Totals	106,000	.....	246,000	

PLAQUEMINES PARISH.

(Right bank, beginning U. S. Barataria Levee District.) Estimate is based on grade 3 feet above high water of 1903.

Name of Levee.	Linear feet.	Feet above H. W. 1903	Cubic yards.	Remarks.
Parish Line to lower line of Fort St. Leon				
0-150	15,000	2.5	30,000	
Belle Chasse				
150-272	12,200	2.0	37,000	
272-298+80	2,680	0.5	54,000	In front of Belle Chasse residence levee too near river bank to be enlarged.
St. Anne				
298+80-321+42	2,262	1.0	10,000	Caving bank. New levee will be required.
321+42-349	2,758	1.5	10,000	
Concession				
349-376+90	2,780	0.5	19,000	
376+90-398+11	2,200	0.5	38,000	In front of Concession residence and quarters too near river bank to be enlarged. New levee will be required.
Concord and Oak Point				
398+11-473+74	7,563	2.5		
473+74-492+32	1,800	0.5	42,000	In front of Oak Point residence caving bank New levee will be required.
Oak Point, Augusta, Cedar Grove, Oakville and Sara				Under contract by U. S. from 600 feet below Oak Point residence and extends down stream to stable on Sara Plantation.
492+32-632+36	4,004	3.0		
Live Oak				
632+36-647+62	1,526	2.5		
647+62-682+12	3,450		100,000	New levee at Live Oak crevasse and rebuilding of levee above and below same.
Barrois				
682+12-693+72	1,160	2.0	6,400	
Jesuits Bend				
693+72-729+06	3,534	0.5	70,000	In front of Church property, Halceron's, Barrois, S. Dotard, Turean, levee too near river bank to be enlarged.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
729+06 to 739+36...	1,000	0.5	7,500	
739+36-831+98	9,262	2.0	15,000	Topping only necessary
Star to La Reussite				
831+98-946	10,950	3.0		Completed by district final certificate Nov. 6, 1906, 45,478 cubic yards, at a cost of $10,232.55.
La Reussite to Alliance Quarters				
946-985	3,920		55,000	Under contract by the State.
Alliance				
985-1005+75	1,875	0.0	14,000	Caving bank, levee too near river bank to be enlarged. New levee will be required involving about 70,000 cubic yards.
1005+75-1026+20 ...	2,045	1.5	6,500	
1026+20-1057+05 ...	3,085	3.0		
St. Rosalie				
1057+05 to 1132+55.	7,550	2.0	23,000	
Ironton				
1132+55-1156	2,345	0.5	15,000	
Myrtle Grove				
1156-1183+60	2,700	2.5		
1183-1212+18	2,900	0.5	36,000	Light loam very much exposed to prevailing winds from the east, lower end caving bank. New levee required.
Myrtle Grove				
12 2+18-1222+96 ...	1,073	2.5		
Myrtle Grove to Wood Park				
1222+96-1333+50 ...	11,154	3.0		
Wood Park				
1333+50-1354+87 ...	2,300	0.5	45,000	Too near river bank to be enlarged. New levee necessary.
Deer Range				
1354+87-1478+25	12,338	3.0		
Junior				
1478+25-1493+94 ...	1,600	0.5	30,000	Too near river bank to be enlarged. New levee necessary.
Junior to Ponte Celeste				
1493+94-1558+91 ...	6,497	3.0		
Pointe Celeste				
1558+91-1579	2,000	0.5	30,000	Too near river bank to be enlarged. New levee necessary.
1579-1596+40	1,740	0.5	9,000	

Name of Levee.	Linear feet.	Feet above H. W. 1903	Cubic yards.	Remarks.
Woodland				
1596+40-1677	8,100	3.0		
1677-1711	3,400	1.5	24,000	
West Pointe a la Hache				
1711-1760+76	5,000	1.0	70,000	Too near river bank to be enlarged. Caving bank. New levee necessary.
Magnolia				
1760+76-1784	2,400	2.0	7,500	
1784-1935	15,100	3.0		Under contract by U. S. Includes Bartholomew settlement.
Socola				
1935+50-1967+60 ...	3,210	3.0		Under contract by United States.
Riceland				
1967+60-1999+35 ...	3,100	2.0	6,500	End of district.
Totals	189,566	.....	810,400	

RECAPITULATION BY PARISHES.

Parish.	Contents of enlargement required. Cubic Yards.	Contents of new levees required. Cubic Yards.
Ascension		150,000*
St. James	95,000	206,000
St. John	10,000	
St. Charles	62,000	
Jefferson	174,000	72,000
Plaquemines	271,400	595,000
Totals	612,400	1,023,000

*Under contract.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 14, 1907.

Mr. Henry P. Dart, President Harvey Canal, Land and Improvement Company, Limited, Harvey, La.:

DEAR SIR—Your letter of the 12th inst. was only received this morning. I was in my office on the 12th at 6:30 p. m., having just returned from a trip, in company with Mr. F. M. Kerr, Chief State Engineer, over the incompleted levees below the city. This trip was made to keep engagements which had been made last Thursday.

It was understood at the meeting of the Lafourche Basin Board, held at Gretna on Thursday, the 10th inst., through Mr. Horace Harvey, that the test of the front gate of the lock would be made the next day (Friday), and a committee from the Lafourche Basin Levee Board, myself and other State Engineers were to be present to witness this test. Some of the members of the Lafourche Basin Levee Board went over to the Harvey Canal Locks on Friday, but, owing to an accident to the pump, the test could not be made. As I had made a previous engagement to go below the city on Saturday, it was impossible for me to remain over to witness the test of the front gate, but I understand that Messrs. Perilliat and Lombard, members of the Board of State Engineers, were present. Mr. Lombard tells me that the test was satisfactory; Mr. Perilliat is absent from the city to-day.

I wish to call your atttention to the fact that the original specifications for the construction of the Harvey Canal Locks require four tests, two of which are direct tests of the efficiency of the front and rear gates, and the third and fourth tests being of the levee around the forebay and around the chamber. The test of these levees cannot be made if the line of public levee on the front be removed. I do not see how the Board of State Engineers can report in full upon the efficiency of these locks if the third and fourth tests are not made. The Board of Commissioners of the Lafourche Basin Levee District may, if it deems fit, waive the tests of the levee.

The lock in its entirety comprises not only the masonry work and gates as designed, but also includes the construction of a levee, in accordance with the specifications of the Board of State Engineers, around the chamber and around the forebay, with suitable junction with the present line of levee; and in addition, if I am not mistaken,

the Harvey Canal Land and Improvement Company, Limited, has obligated itself to build and maintain, in accordance with the specifications of the Board of State Engineers, the present line of levee one hundred feet on each side of the lock.

The partial test of the rear gate was made on August 25, 1905, in the presence of Messrs. Kerr, Lombard and myself, and was pronounced satisfactory. The test of the front gate on August 19, 1905, was abandoned on account of some defects developing, which I believe have since been remedied, as was proven by the recent test made on Saturday, January 12, 1907.

Yours truly,

SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., February 28,1907.

Mr. Sidney F. Lewis, Assistant State Engineer, New Orleans, La.:

DEAR SIR—At your request, I proceeded to the Harvey Canal at 10 a. m. February 26, to witness the test of the lock, in accordance with the third specification.

At the time of my arrival there the elevation of the water in the forebay and the lock chamber was 36.45 Cairo Datum, the elevation of the water in the Mississippi River was 37.3 Cairo Datum. The pump boat Eva was stationed in front of the levee, pumping a six-inch stream of water, besides which there was another small pump operating. Owing to leakage in the rear gate, which was stated by Mr. Harvey and Mr. Lombard to be due to the wicket being partly open, the pumps made very little headway in elevating the water until the tug Independent was called, and at 1 o'clock the water in the forebay and lock chamber stood at elevation 38.00 Cairo Datum.

The water level at Harvey's Canal was 22.52 Cairo Datum, owing to back water from the crevasse, hence there was only 15½ feet of head. When the water level in the lock and forebay stood at 38.00 Cairo Datum, the front gate was opened and closed twice, the water in the forebay remaining at this elevation and slightly above it until 5 p. m.

A quorum of the Lafourche Basin Levee Board, including Mr. Victor Maurin, President, being present, and it being desired that the

lock chamber should be emptied in daylight, the time test of six hours was not insisted upon, but the water was then let out through the rear gate and the forebay held at elevation 38.00. In this condition the rear gate was opened and closed twice.

The levee protecting the lock chamber and forebay is only partly completed, a part of it around the lock chamber being not over 38.00 Cairo Datum. Under these conditions, and until the levee is nearer completion, both around the forebay and lock chamber, the front levee should not be cut.

I consider the test of the levee to 38.00 to have been a success, and on emptying the water from the lock chamber, no weakness to the levee was revealed. I witnessed the maintenance of the water level at 38.00 in the forebay for two hours, and when I left there the pump boat Eva was still pumping and maintaining the water at elevation 38.00, as required in the specifications.

The members of the Lafourche Basin Levee Board present expressed themselves as satisfied with the first test, and I believe that, when the levee are enlarged to a grade of 42.2 Cairo Datum, as designed, both around the forebay and the lock chamber, with proper slopes and crown, the lock should be permitted to be operated. I am satisfied that, while the test was not undertaken at the right time of the day, there was no unusual weakness developed in the levee nor in the lock. I hand you herewith the levelers' notes.

Respectfully,

M. P. ROBERTSON,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 3, 1907.

Hon. Charles T. Yenni, President Board of Commissioners, Orleans Levee District, New Orleans, La.:

DEAR SIR—In accordance with the resolution of your Board, passed at a meeting held at your office on the 30th ult., referring to the Board of State Engineers for consideration, a communication from the Honorable Wm. A. Kernaghan, Vice and Acting President of the Board of Commissioners of the Port of New Orleans, and requesting a "written" report thereon, the Board of State Engineers begs leave to submit, viz.:

This communication appears in the form of a protest, on certain

grounds, against a departure from the general plan proposed and approved in 1903 for the improvement of the levees on the city front, by which the Port Commission has been influenced in formulating its plans and specifications, to that recently recommended, for the same purpose, by the Board of State Engineers, and adopted by the General Levee Conference, called and organized by His Excellency Newton C. Blanchard, Governor of Louisiana, June 4, 1907.

The main points sought to be brought out by the Port Commission in this communication and from explanations made, seem to be to the effect that no circumstances have arisen since 1903 to warrant a change of views in regard to the grade to which the levee lines in the Orleans Levee District, that is, along its commercial front, from Louisiana Avenue to Clouet Street, should be built and maintained, and that in order to reconcile the work of the Port Commission to the general plan now adopted for improving the levees along the river front, the plans of the Port Commission must be reviewed and materially changed, and considerable work already done must be gone over again, at great and, otherwise, unnecessary expense to the Commission.

In reply to this, the Board of State Engineers begs leave to say that no final grades and slopes were ever fixed by it or any one else in 1903, or previously, but that a general plan proposing certain grades and certain slopes was provisionally approved by it.

That the neccessity for a revision of grades along certain parts of the river in Louisiana has been much agitated since 1903, will be seen from the following, quoted from a communication from the Board of State Engineers to the Mississippi River Commission, under date of June 15, 1906, viz.:

"In conclusion, the Board of State Engineers would, in addition to the severe tax imposed upon the Atchafalaya Basin and Lafourche Levee Districts, to construct locks, etc., in Bayou Lafourche, also call attention, in the same connection—that is, the matter of increasing responsibilities and cost—to two matters dwelt upon to some extent in its recent biennial report to His Excellency, Newton C. Blanchard, Governor of Louisiana, copies of which report have been mailed to the members of your Commission, as well as to its Secretary, the several U. S. District officers, and others connected with the service.

"The first matter is that of the grade of levees on the Mississippi,

along its upper and lower lengths, affecting, respectively, the Fifth Louisiana Levee District and the Lafourche, Lake Borgne, Grand Prairie and Buras Levee Districts, in regard to which the report says as follows:

" 'The period covered by this report has been signally marked by a continued satisfactory improvement in the grade and cross section of the lines of public levee treated in the State, the work accomplished having generally been done substantially in accordance with the requirements prescribed by the recognized authorities—United States and States—and thought, with intelligent care and maintenance, to be sufficient for the demands of the future, except, possibly, along that part of the Mississippi River extending from the State line to the vicinity of Delta, La., and from the vicinity of New Orleans to the mouth of the river. Along these lengths of river higher grades than those prescribed will undoubtedly be eventually required."

These views proved at that time to be in accord generally with expressions on the same line from the U. S. District officers and the levee engineers from Arkansas and Mississippi present at the meeting of the Mississippi River Commission.

Previous to this, however, the question of revising grades along certain parts of the river was before the Mississippi River Commission, and the folowing expression by the Board of U. S. District Officers in 1905 is of record in regard thereto:

"With reference to the changes recommended in the provisional levee grade adopted by the Commission, it is recognized that a revision must sooner or later be made, but in view of the fact that levee construction still falls materially below the grade now fixed, and that the study of future high waters will add further information needed to more nearly approximate the ultimate grade, it is recommended that no action be taken at this time." (Extract from Report of the Mississippi River Commission, 1905-6.)

A study of facts, so far, following this, has brought no special action yet by the Commission in regard to that part of the river in the upper part of the state, but a recent report from the United States District Officer in charge of the Fourth Mississippi River Improvement District, including that part of the river in the lower part of the State, has this year resulted in a revision of grades from Carrollton to Fort Jackson, amounting to an increase, for the

present, of 0.65 at Carrollton to 1.0 foot at Fort Jackson, above the previous provisional grade adopted by the Mississippi River Commission for the same length of river.

The grade recommended by the Board of State Engineers for the levee lines in the Orleans Levee District, and adopted, that is, not less than five (5) feet above the high water of 1903, is only something less than 1.5 feet higher than this recent provisional grade adopted by the Mississippi River Commission commencing at Carrollton, and is regarded by it as conservatively in line with the action of the United States authorities.

In this connection the Board of State Engineers thinks that it might be well to again state, in as exact terms as possible, the grade and section intended to be recommended by it to the General Levee Conference of 1907, for levees in the Orleans Levee District, and adopted, viz.: Grade not *less* than five (5) feet above the high water of 1903; crown not *less* than fifty (50) feet wide; river side slope not *steeper* than three (3) horizontal to one (1) vertical; and land side slope not *steeper* than ten (10) horizontal to one (1) vertical. This, it will readily be seen, leaves it open to raise grade, widen crown and flatten slopes whenever and wherever deemed advisable, and conditions require it, in which connection atttention is called to the fact that it has been repeatedly stated by the Board of State Engineers that flatter slopes to accommodate commerce in reaching shipping would in localities be required.

Steepness of slopes, to which, it is shown, the section recommended and adopted is not in reality restricted, the Board of State Engineers understands, is, after all, the only serious grounds for objection on the part of the Port Commission to the section adopted.

The Board of State Engineers, therefore, hastens to submit that it agrees with the Port Commission, that, in localities, slopes should be flatter, and join it in urging that the river and land side slopes be flattened to meet requirements, wherever it can be shown to be advisable to do so, recognizing that in so doing additional conflict with existing local conditions must occur, requiring adjustment, and additional expense involved, for which provision must be made.

In this matter of slopes, the Board of State Engineers would also call attention to the fact, which, however, should be patent to everybody, that there will be neither the necessity nor the opportunity for directly approaching the sheds, wharves and paved thoroughfares from the city, at *all* points along the river front.

As already discussed and proposed, permission is to be granted

property owners to occupy the land side slope of the levee with buildings and improvements, under certain regulations, when completed.

Thus, upon a great many squares of ground the use of the levees as approaches to the thoroughfares, wharves and sheds along the river front will be impossible. Therefore, special reason for extending the land side slopes of levees along such stretches of the river front, beyond the distance required for a 10 to 1 slope, need not necessarily now be considered. Approaches will, in practice and in fact, be largely confined to the wider areas occupied by city and steam railways along the front, and to the streets and avenues abutting upon the levees, wharves and sheds. So that the ground for objection to the adopted provisional grade, and slopes, as a *general* proposition, are not well taken, and it should not be a matter of very difficult engineering to arrange the details for adjusting differences, between all interests involved, in such cases where the flattening of slopes for approaches is demanded, and may require the raising of grades of streets paralleling the river front, and crossing such approaches.

In this connection, the Board of State Engineers would impose upon you a review of the grounds upon which its recommendations as to grade and slopes were based, viz.:

First, the probable increase in flood elevations in the future. In this connection it should probably be explained that, while believing that a close approach to ultimate flood elevations, under normal conditions, has about been generally reached along most parts of the Mississippi River in Louisiana, no authority on the subject would be willing to commit himself yet to asserting this as an established fact, nor to anything more than an estimate of the probable increase in future flood elevations, especially on the lower Mississippi River. The latter is, at all events, still a matter of development in the light and conduct of future high waters, the extent of which should not be minimized.

Second, the Board of Commissioners of the Orleans Levee District, with the approval and co-operation of the Board of State Engineers, was charged, by a special conference of all the largest interests in the district, with the duty of placing the Orleans Levee District upon the highest and most unassailable plane of protection from the floods of the Mississippi River that could be designed and practically and comprehensively carried out, it being predicated that the interests in the district involved and the lives at stake demanded

grades and sections, and treatment for its lines of levees, *superior* to any in the Valley. Anything less than the grade and section recommended and adopted would not, in every sense of the word, be, in the opinion of the Board of State Engineers, materially superior to the other lines of improved levees in the State.

In regard to the necessity for any revision or change in the plans of the Port Commission proper, it is not clear to the Board of State Engineers that any material changes are demanded, but that, by a proper adjustment of the slopes of the levee line, where required for approaches, the Port Commission may proceed with little embarrassment under its original plans.

The Board of State Engineers, therefore, sees no reason for reconsidering its recommendation, but believes that a liberal interpretation of them by the constituted authorities, and an intelligent adjustment of detail, will result in the benefits to the City of New Orleans and the levee district desired and contemplated by all seriously and sincerely concerned in its future welfare and advancement, towards which the construction and maintenance of the best class and character of levee work must rank first and foremost in importance and value, and to which all other forms of improvement must more or less be subordinated.

I have the honor to return, herewith, the communication of Hon. William A. Kernaghan, above referred to, and the typical cross-sections accompanying it. Respectfully,

THE BOARD OF STATE ENGINEERS,
Per FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 14, 1907.

Hon. Charles T. Yenni, President Board of Commissioners, Orleans Levee District, Room 15 Masonic Temple, New Orleans, La.:

DEAR SIR—In response to the request of your Board, by letter, through Mr. C. A. Harris, Clerk and Acting Secretary, under date of the 12th inst., that the Board of State Engineers consider the report of Engineer W. D. Elam of your board, copy of which, and of the resolution calling for said report, was inclosed, and to report upon it, the Board of State Engineers begs leave to sibmit:

The substance of the Resolution calling for a report from Mr. Elam appears to the Board of State Engineers to be as follows:

That an examination of buildings and other forms of improvement now occupying the strip of land along the river front selected for the location of new levees in the Third, Fourth and Seventh Districts, "according to maps made and approved," be made, with the view of reporting what buildings or other improvements, if any, could in his opinion, be allowed to occupy the land slope of the new levees when completed as designed.

Without going into details of Mr. Elam's report, its substance, upon the questions at issue, amounts, in the opinion of the Board of State Engineers, simply to a reiteration of his former disapproval of the occupancy of the new levees when completed by any character of building or improvement other than that heretofore associated with the levee lines outside of the Orleans Levee District.

In order to leave no doubt in its mind, the Board of State Engineers has again visited and inspected the locations in question where it has been proposed, as evidenced by "Maps made and approved" to permanently improve conditions along the city front, from the standpoint of levee construction; and, after mature reflection and consideration, the Board is constrained to again assert that, in its opinion, the occupancy, under proper regulations and ordinances, of the land slope of the new levees, when completed as designed, with buildings and other improvements, public or otherwise, is in every way practicable, and that the adoption of such a policy, if permitted under the laws, should contribute largely to reducing the great cost of carrying out the project in its entirety.

The magnitude of the undertaking to improve, beyond existing and former conditions, the levee lines in the Orleans Levee District generally, was, as is of record, recognized by the Board of State Egineers from the very first, as well as the fact that the execution of the work must necessarily involve great temporary inconvenience to property holders, and require ultimately, at considerable expense, much re-adjustment of conditions to conform to the new situation brought about.

It should be recognized that this would be true of any form of construction whatsoever to carry out any form of desirable public or private improvement, whether along the city front or elsewhere within the limits of the city.

It is a well known fact—stated without any intimation of criticism of the most remote character—that the great drainage system of the

City of New Orleans has not been carried on without much of such annoying and often exepnsive disturbances of existing conditions; neither has the sewerage system, nor the laying of water mains, nor lot filling, nor re-grading streets and banquettes, nor street railways construction and repairs, nor paving extensions—not to go into details with regard to private and corporation building generally.

The extent of each is only a matter of degree and location, and, in a momentous question like that of protection from overflow, the warrant for the disturbance and attendant expense is manifestly more justified than for almost anything else.

Recognizing, from the beginning, the magnitude of the work involved, and the inconvenience and disturbances that must follow, in the wake of construction, the Board of State Engineers is already of record as not expecting it to be undertaken at all points of the river front at once, nor within the immediate future. Nor, when and where undertaken, that it would always be completed in its entirety within one season. But that, where certain classes of enterprises could not, without extreme immediate hardship and current loss, be required to adjust themselves to the new conditions imposed, as much of the improvement as would insure a material advance in existing levee conditions might be undertaken, provided the character of the work so undertaken were in line with the permanent work proposed. and would form part of such work when completed.

In this connection, the Board of State Engineers finds that in the three stretches of levee work proposed and under consideration, but three pieces of property would not come under this class, namely, the Fischer Mill, in the Seventh District, and the Dunbar and Barataria canning factories in the Third District. In the case of these three pieces of property, no parts of the proposed levee improvements regarded as immediately essential can well be carried out without the removal of considerable parts of the structures in each.

At all other points along the three stretches of levee improvement under discussion, there occur, for the most part, vacant areas here and there, coal and stave yards, buildings of small importance, or tottering with age, or manufacturing interests sufficiently far back to permit, with proper safeguards, under carefully executed contracts, the construction of a material part of the proposed new section of levee improevment without delay, this to serve pending the removal, by raising or otherwise, of obstructions from the area to be eventually occupied by the land slope of the levee, and the adjustment of the requirements of these enterprises to the new conditions imposed, the

completion of the full section recommended and adopted for levee improvement to follow within a reasonable length of time.

As the Orleans Levee District has a corps of Engineers itself, the Board of State Engineers does not believe that it should be expected of it, nor that it is incumbent upon it, to furnish detail plans and specifications to govern permits to occupy the land slope of the levees in the parish of Orleans, when so decided. However, as it might, with probably some justice, be said that it is far easier to recommend than to perform, the Board begs leave to submit in general terms, and without going into any specific detail, that any form of building or improvement may, in its opinion, be, in its proper order, permitted to occupy the land slope of levees in the Orleans Levee District, where built to the grades, crown and slopes recommended and adopted, under the following general restrictions:

1. No foundations necessarily involving continuous walls transverse to the axis of the levee line should be permitted.

2. Foundations paralleling the axis of the levee should be provided with ample openings to permit free flow of sipage.

3. Cellars, vaults or other vacancies should not be permitted.

4. All parts of the land slope of the levee occupied by buildings should, with ample auxiliary drainage, be protected by some suitable covering or pavement, to be determined by the character of the business carried on in the building, or the purposes for which it may be occupied.

5. Where it is desired to occupy the land slope of the levee with coal yards, lumber yards, stave yards, cotton yards, or where hauling or traffic may be necessary, etc., the levee generally should be properly paved with some approved form of paving.

6. All run-offs from roofs should be guarded against by proper methods, of which there are a number of designs.

Very respectfully,

THE BOARD OF STATE ENGINEERS,

Per FRANK M. KERR,

Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., May 16, 1906.

Hon. John Dymond, President Board of Commissioners, Lake Borgne Basin Levee District, New Orleans, La.:

DEAR SIR- The Board of State Engineers has the honor to acknowledge receipt of your letter of the 11th inst., forwarding a letter and plan from the New Orleans Terminal Company, relative to its slips, etc., at Port Chalmette, requesting their consideration by the Board of State Engineers, and a report to you as to its conclusions at its earliest convenience.

In compliance with your request, the Board of State Engineers begs leave to submit the following report:

The project proposed at this time by the New Orleans Terminal Company, at Port Chalmette, as far as it concerns the Lake Borgne Basin Levee District, appears, from the letter and the general plan, cross-sections and profiles submitted, and sent by you to the Board of State Engineers for its consideration, to be a substitute for the general plans submitted to you by the same company, through Mr. Dotterer, general manager, on November 18, 1904, referred to by you in a letter to the Board of State Engineers on November 29, 1904, reading as follows:

"BELAIR, LA., November 29, 1904.

"*Board of State Engineers, Cotton Exchange Building, New Orleans, La.:*

"GENTLEMEN—Mr. W. C. Dotterer, general manager of the New Orleans Terminal Company, appeared before our Board at its last regular meeting, which was held November 18, asking our Board to consider the cutting of the public levee near their Chalmette property and building slips for shipping within the limits of the property, all presumed to be adequately protected against danger from the river. I have submitted to you the plans and specifications for the proposed work, as sent in to our Board by Mr. Dotterer, and would ask you to please consider them at your earliest convenience and report back to our Board whether or not you think that the protection of the Lake Borgne Levee District would be adequate with such works as they contemplate and with such limits as to time and additional work and to maintenance, if any be needed, that you may suggest.

"Mr. Dotterer says also, that he and the engineers of his corporation will be glad to meet the State Engineers at any time to discuss the matter, and I would suggest that perhaps it would be well for you to call Mr. Dotterer, or his engineers, into consultation, if you should desire any further light upon the plans and specifications submitted to you.

"All of which is respectfully submitted for your consideration.

"JOHN DYMOND,
"President Lake Borgne Basin Levee Board."

In compliance with your request at that time the Board of State Engineers, under date of December 13, 1904, submitted the following report:

"NEW ORLEANS, LA., Dec. 13, 1904.

"Hon. John Dymond, President Board of Commissioners, Lake Borgne Basin Levee District, Belair, La.

"DEAR SIR—The Board of State Engineers has the honor to acknowledge the receipt of your letter of the 29th ult., saying: 'Mr. W. C. Dotterer, general manager of the New Orleans Terminal Company, appeared before our Board at its last regular meeting, which was held November 18, asking our Board to consider the cutting of the public levee near their Chalmette property and building slips for shipping within the limits of the property, all presumed to be adequately protected against danger from the river. I have submitted to you the plans and specifications for the proposed work, as sent in to our Board by Mr. Dotterer, and would ask you to please consider them at your earliest convenience and report back to our Board whether or not you think that the protection of the Lake Borgne Levee District would be adequate with such works as they contemplate and with such limits, as to time and additional work and to maintenance, if any be needed, that you may suggest.'

"In compliance with your request the Board of State Engineers begs leave to submit the following report:

"The project proposed by the New Orleans Terminal Company at Port Chalmette, as far as it concerns the Lake Borgne Levee District, apepars, from your letter and the general outline, maps and plans submitted to you by Mr. Dotterer, and left by you with the Board of State Engineers, for inspection and consideration, to involve the condemnation and removal of parts of your established line of public levee on the river front of your district at certain

points designated on the maps, and to excavate to certain dimensions inland, and to a depth of thirty (30) feet below the lowest recorded water in the Mississippi River, opposite, a series of slips for harboring ships and other craft, and to restore and maintain, by means of walls of masonry, set on piling, earth reinforcements, grading and other means, the continuity of the line of public levee *around* the proposed slips, under such regulations and safeguards for the protection of the Lake Borgne Levee District as your Board of Commissioners may deem necessary to impose.

"Waiving consideration of legal restrictions, the Board of State Engineers sees no inherent objection to the project proposed by the New Orleans Terminal Company at Port Chalmette, nor does it believe that any serious menace 'to the protection of the Lake Borgne Levee District' is necessarily involved in its consummation, provided the following general conditions and specifications be, by special contract, duly executed between the New Orleans Terminal Company and the Lake Borgne Levee District, imposed and enforced, viz.:

"First, that before any excavation nearer the base of the present controlling line of public levee than 250 feet be permitted, a line of levee the axis of which shall not be less than 250 feet distant from the perimeter of any proposed slip, shall be built and completed by the New Orleans Terminal Company *around* the proposed slip, to a proper junction with the controlling line of public levee above and below the proposed slip, as may be determined by the Board of State Engineers, all work to be done in strict conformity with all the general conditions and specifications usually prescribed by the Board of State Engineers for levee work, and to a grade not less than five feet above the high water of 1903 in the river opposite the proposed slips, with due allowance for shrinkage and settlement, crown not less than 20 feet wide, and slopes not steeper than 3 to 1.

"Second, that the New Orleans Terminal Company shall obligate itself, its successors and assigns by bond, duly approved and accepted by the Lake Borgne Levee District, to protect, preserve and maintain said line of levee, as a public levee, at its entire expense, and to the satisfaction of the Lake Borgne Levee District, during the life of the New Orleans Terminal Company, its successors or assigns, and to cover any and all losses, damages and injuries to the Lake Borgne Levee District resulting from the failure of said New Orleans Terminal Company, its successors or assigns, so to protect, preserve and maintain said line of public levee.

"Third, that the absolute control and jurisdiction over such a line

ot levee shall remain in full force and effect with the Lake Borgne Levee District, as contemplated by law for all public levees of the district.

'Respectfully,

THE BOARD OF STATE ENGINEERS,
"*Per* FRANK M. KERR,
"*Chief State Engineer.*"

In the first plan submitted by the New Orleans Terminal Company, no location for a levee line around the perimeter of the slips, as a substitute for the existing line of public levee on the river front, opposite the slip, at this point, appears, but the Board of State Engineers, in its report to you on the project contemplated by the New Orleans Terminal Company with regard to the removal of said levee, advised you of the necessity of a proper location for a levee line around the slip, under certain safeguards, and general conditions and specifications, to be incorporated in a special contract, to be duly executed between the New Orleans Terminal Company and your Board.

As far as the Board of State Engineers is informed, no such contract has so far been consummated.

However, subsequently, Mr. A. L. Phillips, assistant chief engineer of the Frisco Railroad, called at the office of the Board of State Engineers with plans showing a location for a levee line, which could not receive the approval of the Board of State Engineers. Its location was too near the edge of the slip, and its crown and slopes were to be occupied by buildings; besides which part of its construction included piling and other foreign material.

The Board of State Engineers, therefore, assumes that what is now presented as a substitute for the "Plans previously submitted," refers to the plan for the levee line around the slip suggested by Mr. A. L. Phillips.

The plans now submitted and upon which the Board of State Engineers is again called upon for an opinion and report, conform more nearly to the requirements at first recommended than any so far presented, but the proposed levee line is not surrounded with sufficient safeguards and cannot, in its entire length, be regarded as providing as secure a location as advised in the report of the Board of State Engineers, of December 13, 1905, which says the axis "shall not be less than 250 feet distant from the perimeter of any proposed slip." The Board of State Engineers finds on examination of the present plans submitted that, while the location of the axis

of the levee line along the sides of the slip is shown not to differ materially from that at first recommended by the Board of State Engineers, the difference being only about ten feet, which may not be considered material, the location of the axis of the levee line along the rear of the slip is shown to be not over 170 feet from its edge, instead of 250 feet, or 80 feet less than that first recommended, which latter the Board of State Engineers is not prepared to recommend.

The request that, in the construction of this levee line, two gaps, of the dimensions of 24 and 36 feet, respectively, in width, be left open, down to a grade of 38 feet C. D. (or 0.05 above high water), to be filled in under your direction at such times as high water conditions may render it necessary, is not regarded with favor by the Board of State Engineers, and cannot be advised by it.

In this connection the Board of State Engineers would quote from its biennial report to the Governor, under date of April 20, 1906, viz.:

"The period covered by this report has been signally marked by a continued satisfactory improvement in the grade and cross section of the lines of public levee treated in the State, the work accomplished having generally been done substantially in accordance with the requirements prescribed by the recognized authorities—United States and States—and thought, with intelligent care and maintenance, to be sufficient for the demands of the future, except possibly along that part of the Mississippi River extending from the State line to the vicinity of Delta, La., and from the vicinity of New Orleans to the mouth of the river. Along these lengths of the river higher grades than those prescribed will undoubtedly be eventually required."

In other respects the plans submitted present on their surface no particular objectionable features.

In conclusion, the Board of State Engineers, therefore, adheres substantially to its original recommendation to your Board, under date of December 13, 1904, such modifications as have since been approved by it affecting only details of construction and not the ultimate plan.

Respectfully,

THE BOARD OF STATE ENGINEERS,

Per FRANK M. KERR,

Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., August 16, 1906.

To the Honorable President and Members of the Board of Commissioners for the Lake Borgne Basin Levee District, New Orleans, La.:

GENTLEMEN—Since the date of your last meeting, July 20, I have made an inspection of the levees throughout your district on August 8 and 11, respectively. On August 8 I was accompanied by Mr. Simon Leopold, your inspector, from the lower line of Bohemia to Bertrandville; and on August 11 I was accompanied by Mr. L. Nunez, your inspector, from the lower line of the United States Barracks to the upper line of Linwood.

In the upper part of the district, from the lower limits of the United States Barracks to the lower line of Promised Land, I found that the levees had been freed of weeds to a great extent, but they were very grassy and should be mowed.

From Linwood to the lower line of Bohemia the willows have taken possession of the berme of many of the levees, and should be cut to the width of berme. The levees in many places also need mowing and weeding. The drainage of ponds of water made by old borrow pits in front of Corinne, Story, Caernarvon, Orange Grove, Scarsdale, Stella, Bohemia is now being done under the supervision and direction of the inspectors.

Restoring and strengthening of existing revetment will have to be undertaken before next high water above and in front of the United States Cemetery in St. Bernard Parish; and new revetments will have to be constructed wherever necessary on all work recently built and to be built by the United States Government, the State and district.

The Board of State Engineers has allotted $8,000.00 out of the revenues of 1906 to be expended in earthwork on the levees of your district, and is prepared to advertise for proposals to construct new levees or enlarge existing lines of levee to that amount at such points as you may decide upon at this meeting. A detailed statement of the new levees and enlargement required in your district was submitted to your Board on April 20, 1906, and will be found in the Biennial Report of the Board of State Engineers from April 20, 1904, to April 20, 1906, pages 146-149.

Respectfully submitted,
S. F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 17, 1906.

The following memoranda, compiled from United States profiles, the result of levels taken over the tops of the levees about one year ago, and from recent personal inspection, is submitted in addition to the detailed statement compiled on April 20, 1906:

ST. BERNARD PARISH.

Chalmette.—It is estimated for a new levee some 1,500 feet in length, 25,000 cubic yards, but as there has been no material change in the river bank at this point, these 1,500 feet of levee might be capped, which would involve only about 3,000 cubic yards. From the cemetery down to a distance of 2,500 feet the levee can be enlarged, which will involve about 10,000 cubic yards.

PLAQUEMINES PARISH.

Caernarvon.—For about 25 stations above the lower end of Caernarvon, which vary in height from 0 to about 1 foot above the high water of 1903, the enlargement of which would involve about 25,000 cubic yards.

Stella.—About 1,200 feet just above residence could be capped. This stretch stands about one-half foot above the high water of 1903. This capping would involve about 2,500 cubic yards.

Woodlawn.—The United States Government advertised for proposals under this head for the enlargement of some 12,000 feet of levee below Bertrandville, amounting to something over 43,000 cubic yards, but no bids were received. This letting took place on August 14.

Fanny.—About 3,000 feet of levee, from the lower line up, stands about one-half foot to one foot above the high water of 1903. It will take about 10,000 cubic yards to enlarge this stretch.

Fairview.—Under this head the United States Government advertised for proposals for the enlargement of some 12,000 feet of levee, amounting to about 42,000 cubic yards, but at the letting, on August 14th, no bids were received.

Poverty Point.—From end of present work at Monsecour, under contract by the United States Government, for a length of some

3,000 feet, the levee stands about 1.0 to 1.5 feet above high water of 1903. It would take upwards of 10,000 cubic yards to enlarge this stretch.

Upper Pointe a La Hache.—From Victor Adema to Prosper Ganier a portion of the levee which was enlarged by the U. S. Government in 1902 and subsequently revetted during the high water of 1903, when almost the total river slope was washed away, the existing revetment is rotten, useless and a detriment to the levee, and should be removed, wave wash restored.

Upper Pointe a La Hache, Collette.—Some 3,000 feet of levee in front of this tract stands about from 0 to 0.5 feet above the high water mark of 1903. It will take about 10,000 cubic yards to enlarge this stretch.

Pointe a La Hache.—From the Courthouse down to Martin New levee the levees along this stretch in a great many places stood about one-half to one foot above the high water of 1903, and in some places they had to be capped during the high water of 1903. It would involve about 30,000 cubic yards to enlarge these levees. From Martin New Levee to the upper line of Bohemia will require about 8,000 cubic yards for enlargement. From the angle above the Government light on Bohemia to the lower line of Bohemia, or the end of the district, the levee line stands about one-half foot above the high water of 1903 and it will involve about 15,000 cubic yards to enlarge same.

Respectfully,

SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., November 24, 1906.

Hon. John Dymond, President Board of Commissioners, Lake Borgne Basin Levee District, New Orleans, La.:

DEAR SIR—Your letter of the 23rd inst., submitting, on behalf of your Board, blue prints from the American Sugar Refining Company, showing certain wharf work which that company proposes to construct along the front of its property, near Chalmette, and requesting consideration of the plans by the Board of State Engineers, and a report with suggestions, etc., has been received.

In reply, the Board of State Engineers would say, that wharf privileges would appear to be questions of local consideration, for which the only responsibility of the levee authorities would lie in seeing that no injury to the line of public levee would result from the location and construction of the wharf.

The formulators of the plans submitted appear to have had this view of the matter fairly well in mind. However, the Board of State Engineers would suggest that the company be advised that the levee should, nowhere and under no circumstances, be covered by timber work, or platforms, except for absolutely necessary approaches to the wharf; that no piling or other wood work be driven into or be permitted to rest upon any part of the public levee, nor within three feet of the base of the levee, land and river sides, and that all connections between the property of the company and the wharf be made to span the levee from a point three feet to the land side of the base of the levee to a point three feet to the river side thereof.

In this connection, it occurs to the Board of State Engineers to call attention to a provisional plan agreed upon, after the high water of 1903, between the Board of Commissioners of the Orleans Levee District, the Board of Commissioners of the Port of New Orleans, and the Board of State Engineers, for the Commercial Front of the City of New Orleans. This was to raise the public levee line to a grade three feet, net, above the high water of 1903, widen the crown to not less than fifty feet, and flatten the land side slope of the levee to a slope not steeper than 16 to 1, thus obviating the necessity for approach to the river by ramp, trestle, spans or otherwise, and permitting the wharf structure to be constructed flush with the river edge of the crown of the levees. Such a plan would seem equally applicable in the present instance, in the light of the commercial development apparently assured for that part of St. Bernard, and it would be far easier of execution at this time than at any time in the future.

The Board of Commissioners should also make it clearly understood that it reserves all rights over the levee and batture, and over all approaches thereto, delegated to it under the laws of the State, in the event of the necessity of raising and enlarging the levee or repairing it at any and all times, and to require such ramps or crossings over any bridges, spans, etc., as may be necessary for the free passage at all times of the levee engineer, local inspectors and levee commissioners of the district.

Furthermore, the Board of Commissioners might do well to call the attention of the company to the dangers arising, during periods of high water in the Mississippi River, from the accumulation of deposits around wharf work superimposed upon the slope of the bank of the river, as in the case of the skeleton wharf work in the Third District of the City of New Orleans; and to caution it to be prepared to annually, as the river recedes, wash out from around the piling and wharf structure, accumulations of deposit, not only in the interest of the company itself, but to lessen as much as possible any tendency to disturb the present natural slope of the river bank that might be sensitive to movement in such deposits.

Respectfully,

THE BOARD OF STATE ENGINEERS,
Per FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., Dec. 14, 1906.

Hon. John Dymond, President Board of Commissioners, Lake Borgne Basin Levee District, New Orleans, La.

DEAR SIR: Yours of the 13th inst., with blue print showing proposed plan of suction pipe, Chalmette House of the American Sugar Refining Company, to be placed under the levee in front of the American Sugar Refining Company's property in St. Bernard Parish, under the provisions and in accordance with Act No. 15 of the General Assembly of the State of Louisiana, approved June 22, 1906, has been received.

In answer thereto I would respectfully state that the Board of State Engineers, considering the intent and spirit of Act No. 15 of 1906, can advance no special reason why your Board should not give its consent, provided the pipes are laid in accordance with the plans submitted, and provided further, that in restoring the prism of earth, removed from the levee in order to carry out the work, the earth be wetted and tamped, and that the new section thus restored be in excess of the adjacent sections of the levee, so as to allow for shrinkage.

With regard to this latter suggestion, we would again reiterate what we have previously said in a communication addressed to you on November 24, 1906, viz.:

In this connection it occurs to the Board of State Engineers to call your attention to a provisional plan agreed upon, after the high water of 1903, between the Board of Commissioners of the Orleans Levee District, the Board of Commissioners of the Port of New Orleans, and the Board of State Engineers, for the commercial front of the City of New Orleans. This was to raise the public levee line to a grade three feet, net, above the high water of 1903, widen the crown to not less than fifty feet, and flatten the land side slope of the levee to a slope not steeper than 16 to 1, thus obviating the necessity for approach to the river by ramp, trestle, spans or otherwise, and permitting the wharf structure to be constructed flush with the river edge of the crown of the levees. Such a plan would seem equally applicable in the present instance, in the light of the commercial development apparently assured for that part of St. Bernard Parish, and it would be far easier of execution at this time than at any time in the future."

Respectfully,
THE BOARD OF STATE ENGINEERS,
Per SIDNEY F. LEWIS,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., May 16, 1907.

To the Honorable President and Members of the Board of Commissioners, Lake Borgne Basin Levee District, New Orleans, La.

GENTLEMEN: The recent high water was the earliest and has remained longer against the levees in your district than any previous one of record in this Department. From the beginning of December, 1906, up to the present date, the water in the river has stood above the surface of the adjacent lands, and all contract work for enlarging as well as for the construction of new levees was seriously interfered with. By prompt action on the part of those in authority the incompleted new levee at Monsecour was made secure against the rising river. While the recent flood did not reach to the 1903 mark by an insignificant tenth or two, the long siege of high water was the source of much anxiety, and it was only through persistent effort, efficient patrol and hard work on the part of the constituted authorities that the levees were held. There were several incipient breaks from musk-

rat and crayfish holes in the levees of the Parish of Plaquemines, which would have developed into serious crevasses but for the prompt and vigilant action of the Commissioner and the Inspectors under his authority, notably near the lower line of Fanny Plantation, in front of Harlem Plantation, in front of Cosse's, and on the Bohemia Front, particularly near the lower end of the District, where the levee is very much perforated by crayfish holes.

On the 28th of March, on a receding river, the river having declined some two or three feet, the batture in front of the Bohemia Plantation near its upper line, caved some 150 feet up to the river edge of base of levee. Fortunately, the levee was not breached, subsequently, a week or ten days later, a second cave of bank, below and adjoining the first cave, took place, but was not as serious as the first cave. When the river recedes within its banks it is probable that more and extensive caving will take place on this front, and provisions should be made at the proper time for the construction of a new levee to replace the one now threatened by caving of river bank.

I have compiled a detailed statement, which I desire to transmit to you, at this time, for your information, which shows the condition of your levee line as it exists to-day, from which statement the summary in cubic yards of earthwork required is as follows:

	Cubic. yards.
For Enlargement	815,624
For new levees	247,000
Total	1,062,624

The following statement, relative to work done in your District by the United States, from June 30, 1905, to May 1, 1907, has been kindly furnished to me by Captain J. F. McIndoe, Corps of Engineers U. S. A.

Amount expended from June 30, 1905, to June 30, 1906,

Nothing done.

Amounts expended from June 30, 1906, to May 1, 1907.

	Cubic Yards.	Cost.
Bertrandville	11,881.24	$1,984.17
Monsecour, Sec. 4-5	24,702.52	4,384.70

Sections of above levees yet to be completed:

	Cubic Yards.	Cost.
Monsecour, 1 to 3	38,706.80	6,870.45

Incompleted contracts entered into from June 30, 1905, to June 30, 1906:

	Cubic Yards.	Cost.
Woodlawn	44,043.32	9,689.53
Fairview	42,714.36	8,970.02

The State, since my last report to you of April 20, 1906, has completed the Martin Levee, involving 32,555 cubic yards of earthwork at a cost of $5,575.04, and has two outstanding contracts, Chalmette, in the Parish of St. Bernard, involving some 15,500 cubic yards of earthwork, at 25 cents per cubic yard, amounting to $3,875., on which work has just been started by the contractor, and Caernarvon Levee, in the Parish of Plaquemines, involving some 21,000 cubic yards, at 25 cents per cubic yard, amounting to $5,250., of which about 2,300 cubic yards had been placed in position when the work was interrupted by high water.

The State allotment for this year has not yet been apportioned by the Board of State Engineers, but it is presumed that your District will receive the same consideration as in the past.

The Mississippi River Commission allotments, approved by the Secretary of War April 17, 1907, included an appropriation of $25,000. for the U. S. Lake Borgne Levee District, which includes the State Lake Borgne and Grand Prairie Levee Districts.

Very respectfully submitted,

SIDNEY F. LEWIS,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., May 16, 1907.

Statement showing approximate elevation of levees above High Water of 1903 in the Lake Borgne Basin Levee District, also approximate quantity of earthwork necessary to place said line to a grade 3 feet above the high water of 1903, with crown 8 feet, slopes 3 and 3 to 1.

ST. BERNARD PARISH.

Name of Levee.	Linear feet.	Feet above H. W. 1903	Cubic yards.	Remarks.
Parish line to Fazendeville				
0-68	6,800	3.0		
Chalmette				
68-109	4,100		15,500	Under contract by State interrupted by high water.
Port Chalmette				
109-135	2,600	3.0		
Port Chalmette				
135-169	3.400	2.0	10,000	
169-269	10,000	2.5		
Story				
269-315	4,600	3.0		
315-360	4,500	2.0	10,000	
360-380	2,000	2.5		
Irvine to Millaudon				
380-480	10,000	1.5	50,000	
Millaudon to Poydras				
480-510	3,000	3.0		
Poydras to Parish Line				
510-567	5,700	2.0	10,000	Caving bank. New levee will be required at some future date involving about 60,000 cubic yards.
Totals	56,700	.....	95,500	

PLAQUEMINES PARISH.

Name of Levee.	Linear feet.	Feet above H. W. 1903	Cubic yards.	Remarks.
Caernarvon				
567-582	1,500	1.0	10,000	
582-592	1,000	3.0		
592-632	4,000		29,000	Under contract by State interrupted by high water.
Orange Grove				
632-676	4,400	1.5	27,000	
Kenilworth Residence				
676-686	1,000	1.0	26,000	New levee required. Too near river bank to be enlarged.
Kenilworth Residence to St. Claire				
686-727	4,100	3.0		
St. Clair				
727-745	1,800	2.0	6,000	
St. Clair				
745-826	8,100	3.0		
Mon Plaisir and Scarsdale				
826-913	8,700	2.0	22,000	Caving bank in front of Scaredale sugar house new levee will be required at some future date involving 35,000 cubic yards.
913-961	4,800	1.5	24,000	
Stella				
961-979	1,800	2.0	4,500	
979-997	2,000	0.5	30,000	New levee required, too near river bank to be enlarged.
Mary				
997-1072	7,500	2.0	23,000	
Promised Land				
1072-1097	2,500	1.0	14,000	
Linwood				
1097-1123	2,600	0.0	21,000	
Greenwood				
1123-1170	4,700	1.0	26,000	
Bertrandville				
1170-1198	2,500	3.0		Completed by U. S.
Woodlawn to Fanny Quarters				
1198-1316	11,800		43,500	Under contract by U. S. Nothing done.
Fanny				
1316-1354	3,800	2.0	10,000	

Name of Levee.	Linear feet.	Feet above H. W. 1903	Cubic yards.	Remarks.
Fanny-Belair				
1354-1383	2,900	0.0	30,000	At the upper end of Belair levee should be moved back as it is too near to be enlarged.
Belair				
1383-1428	4,500	2.0	12,000	New levee will be required at some future date in front of sugar house involving 20,000 cubic yards.
1428-1461	3,300	1.0	17,000	
Fairview				
1461-1490 .....c....	2,900	1.5	13,000	
1490-1610	12,000	0.5	42,715	Under contract by U. S.
Burbridge				
1610-1627	1,700	0.0	31,000	Too near river bank to be enlarged. New levee required.
Monsecours				
1627-1690	6,300	0.5	63,409	Under contract by U. S. Interrupted by high water.
Poverty Pt. to St. Sophie				
1690-1740	5,000	1.0	23,000	
St. Sophie-Harlem				
1740-1855	11,500	2.0	30,000	
Harlem				
1855-1877	2,200	2.5		
1877-1895	1,800	1.5	10,000	
1895-1920	2,500	2.5		
Bellevue				
1920-1945	2,500	2.0	9,000	
Pearl-Union				
1945-2015	7,000	3.0		
Upper Pointe a la Hache				
2015-2079	6,400	2.0	16,000	
Savoie to Thibaut				
2079-2157	7,800	1.0	35,000	
Thibaut-Richarine				
2157-2196	5,600	0.5	45,000	
Richarine-St. Thomas Church				
2196-2253	5,700	2.5		
St. Thomas Church-Court House				
2253-2276	2,300	2.0	7,000	
Court House				
2276-2286	1,000	0.0	6,000	
Court House to Hingle				
2286-2329	4,300	1.0	17,000	

Name of Levee.	Linear feet.	Feet above H. W. 1903	Cubic yards.	Remarks.
Hingle to Martin 2329-2392	6,300	0.0	45,000	Includes rectification of line.
Martin to Mevers 2392-2411	2,824	3.0		State contract final certificate Jan. 10, 1907. 32,555 cu. yds. at a cost of $5,575.04.
Mevers to Bohemia 2411-2438	2,700	0.0	17,000	
Upper Bohemia 2438-2463	2,600	1.5	25,000	Caving bank; new levee will be required.
Bohemia 2463-2532	6,900	0.0	42,000	
Totals	199,124	.....	852,124	

RECAPITULATION.

	Enlargement.	New Levees.
St. Bernard Parish	95,500	60,000
Plaquemines	720,124	187,000
	815,624	247,000
New Levees	247,000	
	1,062,624 Cubic Yards.	

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS.
NEW ORLEANS, LA., JUNE 20, 1907.

To the Honorable President and Members of the Buras Levee District, Buras, La.

GENTLEMEN—The flood which came against your levees this year was unprecedented, both for its early stage and the long period of its duration. From the beginning of December, 1906, up to the present date,, the water in the river has stood well above the adjacent lands, and all outstanding contracts for levee work were seriously interfered with, which was the source of much anxiety, and it was only through persistent effort and hard work on the part of the constituted authorities that the Kamlah Levee was made secure to meet the approaching flood.

The highest stages of the river occurred between the 10th and 23rd of February, 1907, when the river reached within 0.2 of a foot of the highest previously recorded water, that of 1903, at the upper end of the district, and stood at practically the same elevation as the water of 1903 at the upper end of Tropical Bend, some 12 miles below the upper end of the district, and at about 0.3 of a foot higher than the high water of 1903 at Fort Jackson, 23 miles below the upper end of the district, and, at the Jump, the lower end of the district, it was 0.43 of a foot higher than the high water of 1903.

Fortunately owing to the vigilance of your Commissioners and your Inspector there was but one small break in your levee line, which occurred at Potash, 4 miles from the upper end of the district, on February 4, 1907.

The cause of the crevasse was the washing out of the fresh earth from a crayfish hole that had been cut out in low river and refilled. Before any serious damage occurred the break was closed.

The State contract for the construction of the Orange Farm Levee, by Mr. James A. Cleary, contractor, was completed July 30, 1906, and involved 21,136 cubic yards, at 24 cents per cubic yard, costing $5,072.64.

The State contract for the construction of the Gregory Levee, entered into with Mr. James A. Cleary, under date of October 10, 1905, work to begin November 1, 1905, and completed December 15, 1905, involving upwards of 8,000 cubic yards of earthwork, at 18.20 cents per cubic yard, amounting to $1,450.00, has so far had no work done under it.

On the State contract for the construction of the Kamlah Levee, entered into with Mr. Fred Hingle, under date of September 25, 1906, to be completed December 1, 1906, involving some 27,000 cubic yards of earthwork, at a cost of 18 2-3 cents per cubic yard, amounting to upwards of $5,000.00, the contractor had placed in position some 5,000 cubic yards when the work was interrupted by high water.

On the State contract for the construction of the McDonogh Farm Levee, entered into with Mr. Fred Hingle, under date of September 25, 1906, date of completion December 1, 1906, involving some 14,500 cubic yards of earthwork, at 18 2-3 cents per cubic yard, amounting to upwards of $2,700.00, nothing has so far been done.

On the State contract for the enlargement and rectification of the Clinton Levee, and new levee at Bougon, entered into with Mr.

Fred Hingle, under date of September 25, 1906, involving some 17,000 cubic yards of earthwork at a cost of 19 1-3 cents per cubic yard, amounting to upwards of $3,300.00, the contractor had placed in position some 2,000 cubic yards on the Bougon section when the work was interrupted by high water.

Making a total of upwards of 66,500 cubic yards of earthwork under contract by the State, in your district, at a cost of about $12,450.00.

The State allotment for this year has not yet been apportioned by the Board of State Engineers, but it is presumed that your district will receive the same consideration as in the past.

The Mississippi River Commission allotments, approved by the Secretary of War April 17, 1907, included an appropriation of $25,000.00 for the United States Barataria Levee District, which comprises the State Lafourche and the Buras Levee Districts.

The United States Government has not expended any money in your district since 1905.

I have compiled a detailed statement, which I desire to transmit to you at this time for your information, which shows the condition of your levee line as it exists to-day, from which statement the summary of cubic yards of earthwork required is as follows: For enlargement and rectification by the construction of new levees, when present line of levee is too near river bank to be enlarged, 591,500 cubic yards.

In conclusion, it would be well to reiterate what was said to you in a report of April 16, 1906, as the experience of the recent flood warrants its repetition, viz: The floods of 1897, 1903 and 1907 have proven that a continued leveeing of the river at its upper end will increase and prolong the flood heights against your embankments, and, in anticipation of same, it would be wise to gradually increase and enlarge such stretches of levee in your district, as have a narrow margin and are less than one foot above the highest water. I would also suggest and recommend that wherever, in the construction of new levees and in the enlargement of existing levees, the same have to be protected by wooden revetments, that the frame-work for such revetments be placed in position under plans and specifications, pending the construction of the earthwork, for by so doing I believe the revetment can be better and more economically braced and anchored, than by laying same after construction of levee.

Very respectfully,

SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., JUNE 20, 1907.

Statement showing approximate elevation of levee above the highest water in the Buras Levee District, also approximate quantity of earthwork necessary to place said line to a grade 3 feet above the highest water, with crown 8 feet, slopes 3 and 3 to 1:

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Upper end of District				
1999+50-2005	500	1.5	15,000	
Point Michel				
2005-2015	1,000	3.0		
2015-2070	5,500	2.5	6,000	
2070-2109	3,900	3.0		
Solis to Treadaway				
2109-2136	2,700	0.5	15,000	This stretch is low, scant in section and requires removal in places.
2136-2144	800	1.5	2,600	
2144-2204	6,000	0.0	40,000	
Treadaway to Ballay				
2204-2234	3,000	1.0	13,000	Stretch is low, scant in section and requires removal of levee in places.
2234-2274	4,000	0.5	22,000	
Guyot Settlement				
2274-2320	4,600	1.0	16,000	
2320-2370	5,000	1.5	15,500	
2370-2384	1,400	0.5	8,000	
Guesnard Woods to Orange Farm				
2384-2437	5,300	0.0	30,000	Caving bank.
Orange Farm				
2437-2454	1,700	3.0		State contract completed July 30, 1906.
Orange Farm to Gregory				
2454-2489	3,500	1.0	11,000	
Gregory				
2489-2497	800	3.0	8,000	Under contract by State.
Nairn to Zibilich				
2497-2563	6,600	2.0	13,000	
2563-2581	1,800	0.5	10,000	
2581-2629	4,800	1.5	13,000	
Vaccaro to Kamlah				
2629-2650	2,100	1.5	5,500	
2650-2715	6,500	1.0	24,000	
Kamlah				
2715-2739	2,400	3.0		Under contract by State.

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards	Remarks.
Santo Oteri to Louderbough				
2739-2795	5,600	1.0	22,000	
McDonogh Farm				
2795-2809	1,392	3.0		Under contract by State.
Louderbough				
2809-2815	600	0.5	3,600	
Louderbough to Hayes				
2815-2833	1,800	1.5	6,000	
Hayes to Moizant				
2833-2844	1,300	0.0	25,000	Too near river bank to be enlarged. New levee will be required.
Moizant				
2844-2850	600	0.0	3,500	
Sunrise				
2850-2861	1,200	00-05	7,000	
Clinton				
2861-2881	2,000	3.0		Under contract by State.
Clinton to Fasterling				
2881-2932	5,200	0.0	40,000	Too near river bank to be enlarged. New levee will be required.
Fasterling				
2932-2944	1,200	1.5	4,000	
Fasterling to Bougon				
2944-2964	1,600	0.5	12,000	Too near river bank to be enlarged. New levee will be required.
Bougon				
2964-2968	500	3.0		Under contract by State.
Bougon to Buras Church				
2968-2983	1,560	1.5	6,500	
Buras Church				
2983-3000	1,856	3.0		
Pelican Store to Vancouch				
3000-3021	2,100	0.5	10,000	
Knoll				
3021-3109	8,800	1.5	17,000	
Smith				
3109-3134	2,500	2.0	6,000	
Baker				
3134-3143	1,100	1.0	12,000	Too near river bank to be enlarged. New levee will be required.
Levee to Reddick				
3143-3177	3,200	1.5	8,500	
Reddick				
3177-3183	600	3.1		
Reddick to upper line of Fort Reservation				
3183-3239	3,600	1.0	13,000	

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Fort Jackson				
3239-3287				
3287-3335	4,800	1.0	15,500	
Fort Jackson to Schoenborger	4,800	0.5	19,000	
3335-3358				
Schoenborger to McCormick	2,300	1.0	7,000	
3358-3468				
McCormick to Jump	11,000	3.0		
3468-3574				
35-74-3618	10,600	1.5	26,500	
3618-3680	4,400	1.0	11,500	
3680-3758	6,200	1.5	18,000	
Jump	7,800	1.0	20,500	
3758-3789				
3789-3795	3,100	1.5	8,000	
	600	0.0	1,800	
Total		.....	591,500	

STATE OF LOUISIANA,
OFFICE OF BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., APRIL 9, 1907.

To the Honorable President and Members of the Board of Commissioners for the Grand Prairie Levee District, Pointe a la Hache, La.:

GENTLEMEN—The levees in your district, during this period of high water, have been subjected to an early and prolonged strain. The highest stages of the river occurred between the 10th and 23rd of February, 1907, when the river reached within 0.2 of a foot of the highest previously recorded water, that of 1903, at the upper end of the district, and stood at practically the same elevation as the water of 1903 at Harris Canal, some 11 miles below the upper end of the district, and at about 0.3 of a foot higher than the high water of 1903 at Fort St. Philip, 24 miles below the upper end of the district.

The State contract, Waltzer to Nester Canal, entered into with Mr. Fred Hingle, involving 40,292 cubic yards of earthwork, at 15 2-3 cents per cubic yard, costing $6,312.41, was completed and a final certificate issued under date of November 23, 1906.

In addition, two important pieces of work were put under contract by the State as follows:

Baptiste Collette Gap Levee: Contract entered into with the Louisiana Navigation and Fisheries Company, under date of October 1, 1906, work to be completed January 1, 1907. Involves about 34,172 cubic yards of earthwork, at the price of 38 cents per cubic yard, amounting to upwards of $13,000, which the State of Louisiana is obligated to pay, when completed, less the sum of $2,500 to be contributed as follows: $1,000.00 by the Oyster Commission of Louisiana, and $1,500.00 by the Board of Commissioners for the Grand Prairie Levee District. When work under this contract was interrupted by high water, in the latter part of December, some 5,725 cubic yads of earthwork had been placed in position on the side lines of the levee to inclose this gap.

Lower Grand Prairie Levee: Contract entered into with Michael Cullen under date of October 31, 1906, to be completed December 25, 1906. Involves about 12,000 cubic yards of earthwork at the price of 21 cents per cubic yard, amounting to upwards of $2,500.00. This contract consisted of closing some fifteen gaps in the levee line near the lower end of the district, from above Old Quarantine Station to New Canal, a distance of about 9½ miles, these gaps having been caused by the levees being breached by waves from the Gulf during the equinoctial storm of September 26th and 27th, 1906. In the latter part of December many of these gaps were not sufficiently advanced to withstand the water in the river that rose rapidly against them, and in the early part of January the water ran through them and to this date they remain unclosed. When work was interrupted by high water some 1,768 cubic yards had been placed under this contract.

The inclosed statement, which is prepared from recent surveys made under the direction of the United States Engineer Officer in charge of the Fourth District, Improving Mississippi River, contains the approximate elevation of your levees above the highest water, with approximate quantity of earthwork necessary to place said line to a grade 3 feet above the highest waters recorded in the district, which means the water of 1903 at the upper end and that of 1907 at the lower end, with crown 8 feet, slopes 3 and 3 to 1; also contains an estimate, based on same grade and section, for new levees required in anticipation of future caving banks, and the rebuilding of certain stretches of levee, deficient in cross-section, which

are too near the river bank to be enlarged, or which have been washed away by storm waves from the Gulf.

In conclusion it would be well to reiterate what was said to you in the previous report of a year ago, as the experience of this flood warrants its repetition, viz: The floods of 1897, 1903 and 1907 have proven that a continued leveeing of the river at its upper end will increase and prolong the flood heights against your embankments, and, in anticipation of same, it would be wise to gradually increase and enlarge such stretches of levee in your district as have a narrow margin and are less than one foot above the high water of 1903.

Very respectfully,

SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., APRIL 8, 1907.

Statement showing approximate elevation of levees above highest water in the Grand Prairie Levee District; also approximate quantity of earthwork necessary to place said line to a grade 3 feet above the highest water, with crown 8 feet, slopes 3 and 3 to 1:

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Bohemia to Waltzer 2531+35-2648+35 ...	11,700	1.5	46,800	New levee will be necessary below Tabouey's on account of caving river bank.
Waltzer 2648+35-2663+40	1,505	1.0	6,000	
Waltzer to Nestor Canal 2663+40-2775	11,160	3.0		Completed by State Nov. 23, 1906.
Nestor Canal to Burton 2775-2842	6,700	1.5	20,000	
Burton to Chas. Struhe 2842-2964	12,200	3.0		
Chas. Struhe to Edgecomb 2964-3004	4,000	2.5	5,000	

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
Edgecomb to Zettwock 3004-3030	2,600	1.0	10,400	
Zettwock-Matulich 3030-3060	3,000	1.5	7,500	
Harrisburgh 3060-3110	5,000	1.0	15,000	
BaByou Lamoque to Pt. Pleasant 3110-3218	10,800	3.0		
Point Pleasant to Nicholls P. O. 3218-3310	9,200	0.5	45,000	
Nicholls P. O. to Jacomini 3310-3450	14,000	0.5	70,000	
Devils Flat 3450-3526	7,600	3.0		
Old Quarantine 3526-3542	1,600	1.5	6,000	New levee necessary; old levee badly crayfished.
3542-3550	800	1.5	3,000	Enlargement.
John R. Kelly 3550-3552	252		1,790	Under contract by State to Michael Cullen breached by storm of Sept. 26 and 27.
Cuselich Canal to La. Nav. & Fisheries Co., Canal 3552-3563	1,100		3,500	Under contract by State to Mike Cullen. Breached by storm of Sept. 26 and 27.
La. Nav. & Fisheries Co. Canal to Polite's Canal 3563-3583	2,000	0.5	5,000	
Polite's Canal to Herman Bick lower line 3583-3644	6,100	0.0	15,000	
Bicks to Brophy 3644-3662	1,800	1.0	5,500	
Brophy to Arms 3662-3683	2,100	0.0	7,500	
Arms to Fort Reservation 3683-3768+85	8,585	1.0	35,000	In this stretch there are nine gaps aggregating over 6,000 cubic yards of earth under contract by the State to Michael Cullen. Gaps

Name of Levee.	Linear feet.	Feet above H. W.	Cubic yards.	Remarks.
				caused by levees being breached by waves from Gulf during equinoctial storm of September 26 and 27.
Fort St. Philip lower line to Bayou Goubray				
3840-3962	2,300	0.5	6,000	
Bayou Goubray to New Canal				
3863-3983	12,000	0.5	30,000	In this stretch levee was breached below Bayou Goubray and near Ostrica Canal by waves from Gulf during the storm of Sept. 26 and 27.
New Canal Settlement or Olga				
3983-4023	4,000	0.0	10,000	Levees between Canals breached during the storm of Sept. 26-27.
Below New Canal				
4023-4070	4,700	0.5	10,000	
Lucas Canal Levee, built in 1905				
4070-4131+62	6,140	2.5	7,000	
Extension of system to Bayou Baptiste Collette	16,000		80,000	
Bayou Baptiste Collette	6,780		34,172	Under contract by State to La. Nav. & Fisheries Co., Ltd.
Total		.....	485,162	

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., APRIL 8, 1907.

Estimate for new levees required in the Grand Prairie Levee District, based on a grade 3 feet above the highest water, with crown 8 feet, slopes 3 and 3 to 1:

Name of Levee.	Length in feet.	Cubic yards.	Remarks.
Taboney 60-75	1,600	20,000	
Old Quarantine 1001-1027	2,700	26,500	
Totals	4,300	46,500	

New levee necessary at Taboney's owing to caving river bank. New levee necessary at Old Quarantine at upper end owing to present levee being honeycombed with crayfish holes at upper end and line of levee at lower end threatened by caving of river bank.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., APRIL 11, 1907.

Hon. Aaron Davis, President Board of Commissioners, Plaquemines Parish, East Bank Levee District, Pointe a la Hache, La.:

DEAR SIR—I was exceedingly sorry that you were not able to join us on the inspection of the Gulf Coast Levee, from the upper line of Harlem to the lower line of Bohemia, made last Monday, the 8th inst., by Commissioner Henry Fox and Secretary E. A. Schayot of your Board, ex-Commissioner Felix Hingle, Mr. Gervais Lombard and myself, representing the Board of State Engineers, and Mr. E. P. White, representing Menzies & Co., the contractors.

A thorough inspection of the levee from the upper line of Harlem to the lower line of Bohemia, was made. This length of line, with the exception of a stretch of about 90 feet in length, between Flags 9 and 10, near the line between the property of Messrs. Felix Hingle and Frank C. Mevers, and a small stretch above Grand Bayou, and

also across Grand Bayou, is completed in accordance with the general specifications and conditions of the contract.

Since the inspection was made, work has been going on above and across Grand Bayou to bring the embankment up to the required grade and section. The reason given to me by the contractors for leaving the incompleted stretch of 90 feet, above referred to, is that they were requested to do so by Mr. Felix Hingle, who was then Levee Commissioner, Mr. Hingle stating that he would bring the matter up before the Board at its next meeting. As your Honorable Board has since had no meeting, or if it has, this matter has never been brought up before it, as far as I am aware of, I would respectfully request that you notify this office at once if it be the desire of your Board that the stretch in question remain in its present incompleted condition.

A final certificate will probably have been earned by the contractors at the end of this week, but I will not issue same unless I learn from you that this incompleted stretch was left by the contractors by instruction of your Board.

Yours truly,

SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., May 17, 1906.

Mr. T. W. W. Stinson, Benton, La.

DEAR SIR—In compliance with the request of yourself and others owning property, or interested in property, in what is known as the "Phelps Lake Region," in Bossier Parish, La., the undersigned, the early part of this month, made a reconnaissance of the territory proposed by you to be included in a new levee district to protect the said region from overflow from the waters of Red River.

The object of this reconnaissance was to arrive at an approximate estimate of:

First: The extent, and an opinion as to the prospective value, agriculturally, of the territory proposed to be protected from overflow;

Second: The practicability of successfully protecting it by means of levees; and

Third: The character, length, contents and approximate cost of the levee line required.

The Board of State Engineers begs leave to report:

First. That the area embraced within the limits of the proposed levee district, as shown on a map supplied by the parties in interest, aggregates 23,500 acres; that the land is generally rich and fertile, and, when protected from overflow and improved, should be well adapted to cultivation;

Second. That the area can be successfully protected from overflow from the waters of Red River by means of levees, provided, the territory in Arkansas, above, be similarly protected; and

Third. That the character, length and approximate contents and cost of the levee line required are as follows:

Character of work, largely through timber; soil, next to river, sandy loam, in bottoms mixtures of sandy loam and buckshot.

Length of levee line required about 12.5 miles; average net height (3 feet above high water) for entire line, about 12.5 feet, extremes ranging from 8 to 18 feet.

Contents of levee line, with crown 6 feet wide and slopes of 2½ and 2½ to 1, about 1,200,000 cubic yards.

Approximate cost, based upon the average price per cubic yard prevailing for levee work in the State during the past two years, $211,000.00.

However, to completely exclude the waters of Red River from the district, its main drainage artery, Posten Bayou, must be closed near its mouth by the levee line. This closure of Posten Bayou would, in turn, impound within the district not only the rainfall to which it is itself annually subject, but that of quite an extent of territory in Arkansas above as well.

To relieve this situation, to a greater or less degree, dependent upon seasons and immediate local conditions, four plans have been discussed, viz:

First. To leave Posten Bayou open to permit drainage into Red River when low enough, as at present, submitting to such overflow as will thereby occur from time to time from back water in times of flood in Red River;

Second. To construct, near the mouth of Posten Bayou, a gate or culvert to exclude back water at such times;

Third. To install an adequate pumping plant, near the mouth of Posten Bayou, to lift the rain water, at all times, over the levee;

Fourth. To install a battery of siphons, at or near the same point, to perform practically the same work.

Plan No. 1 must, at times, subject the greater part of the area to overflow for short periods, nullifying to a material extent any benefits realized at other times, besides exposing the lower end of the levee line to more or less loss sooner or later, from washing away, no matter how well protected.

Plan No. 2, while excluding the water from Red River, when closed and maintained, must impound drainage water, just as in the case of the uninterrupted levee line.

Plan No. 3, to be effective, would be prohibitive on account not only of initial cost, but of maintenance as well.

Plan No. 4 alone appears to promise partial relief at a comparatively small cost, but only when the surface of the water in Red River is lower than the surface of the drainage water within the levee line at or near the lower end of the system. Under a head of 5 feet, an efficient battery of siphons, properly equipped with facilities for constant and rapid priming, should reduce the overflow from as much as a three-inch rain to such a level in time to insure, at most times, little material damage to the territory at large involved, and the cost of this battery of siphons and equipment should not exceed $15,000.

These are the general facts governing in the matter. With these before them, the policy of the undertaking should rest with those proposing to invest their money in it. It is simply a question of whether the investment will pay, with which the promoters of the enterprise should be far more capable of dealing, and the commercial practicability and value of which they should be far better able to determine than the engineer. With regard, we remain,

Yours very truly,

FRANK M. KERR,
Chief State Engineer.
GERVAIS LOMBARD,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., July 19, 1906.

Mr. E. D. Burgess, Secretary North Bossier Levee District, Care Vordenbaumen-Eastham Co., Ltd., Shreveport, La.

DEAR SIR—Your favor of the 17th inst., advising me of the organization, on that date, of the Board of Commissioners of the North Bossier Levee District, etc., was received this morning, and I thank you for your promptness in supplying the information.

In regard to the survey of the line of levee proposed to be constructed in the district, I will say that the Board of State Engineers will be prepared to undertake it just as soon as officially and definitely advised that your district is prepared to advertise for proposals to construct the work recommended by the Board of State Engineers.

I presume, of course, that no active steps towards construction will be taken by your district until satisfied in regard to the status of the line of levee in Arkansas, above, and of the certainty of its being carried down to the State line, at least within the season in which work is commenced in your district. It would be a wanton waste of effort and of public money for your district to proceed to construct its line of levee without this certainty.

As far as estimates of contents and cost are concerned, the Board of State Engineers has already prepared figures for the guidance of your district from data at hand.

These figures place the length of line required at about 12.5 miles, contents about 1,200,000 cubic yards, and cost about $211,000.

This is ample information, in that direction, up to the time your district is in a position to advertise for proposals to build. When so fortified, the Board of State Engineers will, upon request, put a survey party in the field to locate and survey the line, or as much thereof as can reasonably be expected to be constructed within one season.

You may rest assured that no delays will occur on the part of the Board of State Engineers.

Locating, staking and surveying lines for levees much in advance of the time fixed for their construction, invariably involves re-location, re-staking and re-surveying, and, therefore, considerable additional cost, which the Board of State Engineers, with the limited means at its command for such purposes, must carefully guard against as much as possible.

As you understand, all levee work undertaken by levee districts must carry with it the recommendation of the Board of State Engineers, in which connection it is the duty of the Board of State Engineers to designate one of its members to attend each meeting of the Board of Commissioners, when previously notified, and to report to and advise the Board as to the location, construction and repair of all levees necessary for the protection of the district, and render any other service needed for the systematic and comprehensive conduct of the affairs of the district.

To this end the Board of State Engineers hereby designates Mr. Gervais Lombard, Assistant State Engineer, and member of the Board of State Engineers, to attend the meetings of your Board of Commissioners, and to conduct the engineering work required in the district, and you are requested to kindly advise him promptly in advance of all meetings to be held by the Board.

Of course, it will give me pleasure, when possible to attend the meetings of your Board, and also, as well as to render you, in conjunction with Mr. Lombard, every assistance in my power to successfully accomplish the objects of your organization.

I think it would be well for Mr. Lombard to be present at the proposed conference to be held between the committee from your Board and the Board of Commissioners of the Long Prairie District in Arkansas. I should imagine that many matters might be brought up for consideration and discussion in which his general information and advice would be of material assistance to your committee.

If such be the wish of the committee please advise Mr. Lombard somewhat in advance of the conference, in order that he may so arrange his engagements as to be able to attend.

In order to keep fully advised of operations in the levee districts, and, thereby, render prompt and intelligent assistance, the Board of State Engineers finds that copies of all proceedings of Boards of Commissioners are essential to its guidance.

Copies of proceedings are, therefore, expected from secretaries, and the Board of State Engineers would request you, at your convenience, to please also keep it informed in regard to all proceedings. All proceedings thus received are filed for reference.

In conclusion, permit me to assure you that the Board of State

Engineers will be pleased, at all times, to render the North Bossier Levee District every assistance in its power, and wishes the district every success.

Yours very truly,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., March 20, 1907.

To the Board of Commissioners, Caddo Levee District, Shreveport, La.:

GENTLEMEN—I have the honor to report that within the past two days I have made an inspection of your system above Shreveport, commencing at Mr. Sentell's Plantation and extending on up to Blanton's Bluff in Arkansas.

On the upper end of Mr. Sentell's place, caving has reached to within about seventy feet of the center of the levee, and is continuing at slow rate. While this is quite close, I do not think it is necessary to undertake the construction of a new levee there immediately, as the levee is a very small one and at a place where a run-around could be easily constructed during high water, should it prove necessary.

On the Hayti Plantation immediately opposite the old Abney residence, caving has reached to within 185 feet, but is progressing slowly, so that the new levee will not be necessary until after the next high water, if then.

Opposite the upper end of the Briarfield Plantation, there still remains some 250 feet, and caving seems to have decreased in activity. The same complaint, however, which was made to you some time ago in regard to the condition of the public road immediately at the base of the levee on the land side will have to be repeated. The trouble is that only about 15 feet of space has been left for a roadwawy, the fences having been placed entirely too close to the levee. The same may be said of the Egypt Place and Peru Plantation and up at Elmer Plantation, and perhaps one or two others which I do not now recall.

At the lower end of the new Cedar Bluff Levee, the public ferry crossing has never been constructed, and traffic is abusing the levee

very materially, as they are crossing immediately at the junction of the new and the old levee, which is the weakest portion of the system. Notice should be sent to them at once to discontinue this abuse. I will again have to report that the Cedar Bluff and Crescent levees are again covered with weeds and saplings and should be cleared of same, as the trees are growing very rapidly and have already taken possession of these levees.

Just above the Wild Lucia Store about a quarter of a mile near Glycerine Bayou, caving has reached to within 115 feet of the center of the levee, but seems to be gradual and the conditions will tide over at least one more season. Immediately at the upper end of the Elmer Levee, built by the convicts about the year 1903, there is only 170 feet margin. However, I do not believe there is any danger of the levee caving in until after one more high water.

At the Thompson Store, there remains but 130 feet from the center of the levee to the river bank, and while there has been but little change there during the past few months, conditions look ripe for serious caving, and I feel that it will be unsafe to take chances for even one more high water, therefore I recommend that a new levee be constructed at this point without loss of time.

At Rattling Slough, conditions have not changed materially, except perhaps below where the Government has undertaken the protection of the bank. The spurs built by the Government seem to have done their work well, and I feel confident that no new levee will be necessary there. At any rate, within the immediate future.

About half a mile above Scott's Slough and immediately opposite a new church or school house, caving has reached to within about 220 feet of the center of the levee and gives promise of continuing at a rather rapid rate. While no new levee is necessary yet awhile, this place should be carefully watched.

It has been some time since I made an inspection of the levee system below Shreveport, but from reports from your Honorable President, I understand that there is no necessity for the construction of any new levees in the immediate future. There is one place, however, viz: Campo Bello, which has steadily caved during the past freshets until it is now within about 200 feet of the center of the levee, and where a new levee may have to be constructed in the very near future. When I saw it some six weeks ago, I was of the opinion that the levee would last for at least one more high water, but Mr. J. M. Robinson, who lives in the neighborhood and has had considerable experience in levee matters, expressed the fear that it

might not last through one more high water, and as the levee was quite a large one there would be small chance of success in building a run-around behind it during the high water, especially as this run-around would have to go through a very rough and timbered place.

I have the honor to report that the Logie Lea Levee on Mr. Moss' place has been completed and accepted, and the Whitehall new levee, also a State contract, is somewhat more than half completed, with an adequate force still on the ground.

Work upon the Gold Point to Cash Point contract has only recently been started in earnest. There was a small force on the ground for several weeks before the real force arrived, and this small force did considerably more harm than good. It seems that they had never constructed any levee work before, and did not realize the importance of carrying out the specifications strictly. They have failed to properly clear the base of the levee, and in fact, had been bringing into the dump cotton stalks and other trash from the pits. They had also failed to blow out or grub some few stumps. I have, however, instructed the contractor to make good any damage that has already been done.

Respectfully submitted,

GERVAIS LOMBARD,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 5, 1907.

To the Honorable Board of Commissioners, Caddo Levee District, Shreveport, La.:

GENTLEMEN—At your last regular quarterly meeting, on the 20th ult., I was requested by resolution, to make an inspection of the district between Twelve Mile Bayou and Cross Bayou, just above Shreveport, and to report at this meeting upon the project of extending your levee system from its present lower terminus to Cross Bayou.

As stated verbally at the last quarterly meeting, a report upon this project had already been submitted to your Honorable Board in 1902, and I submit herewith a copy of said report. Since the submission of that report the State and district have undertaken about 125,000 cubic yards of the 1,800,000 estimated to be required to close

the gap between Gold Point and Shreveport, leaving about 1,675,000 cubic yards. Besides the actual levee work it will be necessary, when Twelve Mile Bayou is diked, to provide a new channel for Twelve Mile Bayou into Cross Bayou. This new channel would cost somewhere in the neighborhood of $30,000.00.

The original estimate was for a levee entirely within the Parish of Caddo, while the line proposed on the blue print submitted by Mr. Glassell shows a part of Bossier Parish included within the protected district; and the location suggested by Judge Hall, namely following the bank line of Red River instead of Twelve Mile Bayou, would include more of Bossier Parish, not to mention the fact that all the line in Caddo Parish below the Cuba Plantation, is outside the limits of your jurisdiction, having been exempted under the provisions of Act No. 90 of 1894 and the report of the Board of State Engineers to your Honorable Board, dated November 19, 1894. (See copy of same also submitted herewith.)

Respectfully submitted,

GERVAIS LOMBARD,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 12, 1902.

Hon. W. F. Taylor, President Board of Commissioners, Caddo Levee District, Shreveport, La.:

DEAR SIR—In compliance with the request of your Board, embodied in a resolution passed at a meeting held on the 19th of last month, the Board of State Engineers has the honor to submit a report:

The resolution of your Board reads: "It being the belief of this " Board that conditions on Red River have so materially changed " that the territory between Twelve Mile Bayou, Red River, and " the highlands, exempted from the operations of the act of incor- " poration of this district, is now receiving great benefits from the " levee system and should be again included in the operations of said " act, a report of such conditions, benefits, etc., is hereby requested " from the Board of State Engineers, to be submitted at the next " meeting of this Board, to be used as a basis of further action by " this Board."

The exemption referred to dates back to the year 1894 and embraced the "land bounded by the bluffs bordering Soda Lake, Cross " Lake and Cross Bayou, from a point at or near Albany, where the " navigable channel of Twelve Mile Bayou or Soda Bayou touches " said bluffs, to Red River, thence by Red River up to the line " between Sections 35 and 36, T. 19 N. R., 14 W., thence south on " the line between Sections 35 and 36, T. 19 N. R., 14 W., and " Sections 1 and 2, T. 18 N. R., 14 W., to Twelve Mile or Soda " Bayou, thence by the navigable channel of said Twelve Mile or " Soda Bayou to the point first mentioned at or near Albany."

At that time (1894), the levee line above Shreveport extended continuously *only* from Blanton Bluff, Arkansas, to the lower side of Sale and Murphy Canal, in Caddo Parish, La., about three (3) miles in length, reaching down to a point about two (2) miles below the State line, and from a point about three (3) miles above Red Bayou to Hurricane Bluff Plantation, a length of about 22.5 miles.

The gaps in the line of public levee above Shreveport were therefore, then, as follows: First, from the Sale and Murphy Canal to a point about three (3) miles above Red Bayou about 11.5 miles wide by the river, including the outlets known as O'Rourke's Slough, Scott's Slough or Kunz's Canal, and Hervey's Canal; and second, from Hurricane Bluff Plantation to Shreveport, about 29 miles wide by river.

The Board of State Engineers, at that time had reason to believe that, through the combined efforts of the State, the District and the United States, the gap from Sale and Murphy Canal to Red Bayou, would be eventually closed, and the line below Hurricane Bluff Plantation considerably extended. This would, of course, tend to improve protection against the waters of Red River, its tributaries and outlets, over that part of the district lying above the lower end of the continuous line of public levee, when built, and widen the influence of this protection as the levees might be extended.

The probable cost, however, of constructing that part of the line below the Cuba Plantation, down to Shreveport, appeared so considerable compared with the means available, and the value of the property affected, coupled with the necessity of leaving Cross Bayou open to afford drainage to the large watershed above, from Jefferson, Texas, to Shreveport, acting at times as a necessary outlet, and at others as an injurious inlet, depending upon the stages of water in Red River, that the Board of State Engineers was led to report that

"the land within the boundaries described below is so situated as not to be susceptible of protection from the waters of Red River, with the means available under existing laws."

At this date, the line of public levee in the Caddo Levee District, above Shreveport, is continuous from Blanton Bluff, Arkansas, to Gold Point, a length of levee about 40 miles, and a distance by river of 53 miles, closing all outlets or inlets in that distance, materially extending the benefits of protection against the waters of Red River to the land above, and reducing the periods of overflow to which the lands below are susceptible.

A gap, however, still remains, between Gold Point and Shreveport. The width of this gap, by river, is about 21 miles, the levee line to close which is estimated at about 19 miles in length and to require as much as 1,800,000 cubic yards of earthwork, divided as follows: On upper ten miles (from Gold Point to lower side Cuba Plantation), about 450,000 cubic yards; and on the lower nine miles (from lower side Cuba Plantation to Shreveport), or that part of the levee line required along the river front of the territory exempted, about 1,350,000 cubic yards.

Furthermore, the necessity of leaving Cross Bayou open is as imperative now, and will continue to be so in the future, as at any time in the past, so that even if the levee line was extended so as to include the land described in this exemption, the susceptibility of the greater part, if not all of it, to overflow from the high waters of Red River, backing up over it, will remain.

It is, therefore, still the opinion of the Board of State Engineers that the land within the boundaries described is so situated as not to be susceptible of protection from the waters of Red River by the levee district, "with the means available under existing laws."

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per F. M. KERR,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, Nov. 19, 1894.

Hon. Walter J. Crowder, President Board of Commissioners of the Caddo Levee District, Shreveport, La.:

DEAR SIR—In conformity with the resolution of your Board, passed at a meeting held on November 2, 1894, requesting the Board of State Engineers "to make a survey and examination for the purpose of ascertaining what lands, if any, are exempted from taxation for levee purposes, in accordance with Act No. 90 of the Acts of 1894," the Board of State Engineers, after having made the necessary survey and examination, has the honor to submit the following, viz:

The language of that part of the act referred to and bearing upon the question submitted, is as follows: "And no other lands embraced in this district shall be exempted from taxation or local assessment except such lands as are in the opinion of the Board of State Engineers so situated as not to be susceptible of protection from the waters of Red River by the levee district."

In the opinion of the Board of State Engineers, the land within the boundaries described below, is so situated as "not to be susceptible of protection from the waters of Red River by the levee district," with the means available under existing laws, viz: The land bounded by the bluffs bordering Soda Lake, Cross Lake and Cross Bayou, from a point at or near Albany, where the navigable channel of Twelve Mile or Soda Bayou touches said bluffs, to Red River, thence by Red River up to the line between sections 35 and 36, T. 19 N. R. 14 W., thence south on the line between sections 35 and 36, T. 19 N. R., 14 W., and sections 1 and 2, T. 18 N. R., 14 W., to Twelve Mile or Soda Bayou, thence by the navigable channel of said Twelve Mile or Soda Bayou to the point first mentioned at or near Albany.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per HENRY B. RICHARDSON,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 9, 1908.

Hon. E. G. Richard, President Board of Commissioners, Red River, Atchafalaya and Bayou Levee District, Melville, La.:

DEAR SIR—I found, on my recent trip on the Atchafalaya River, that the work your Board did towards tying the end of the levee at Latanier is proving thoroughly efficient, and gives every promise of holding out without any trouble during the remainder of the high water season. In fact, the presence of the railroad embankment for so great a distance towards the land side has, in my opinion, prevented much of the water from running up stream, and this kept the water on the land side, below the end of the levee, at a higher elevation, and resulted in less velocity of current, so that there is not much to fear from swift current around the end.

You no doubt remember the place where the water ran around the end of the levee last year, and washed out the angle below Three Mile Bayou, and fresh dirt was used to replace it. I will call your attention to the fact that the unequal settlement between this new dirt and the old portion of the levee has caused a crack to open, about five inches wide, for a distance of some seventy-five feet, and while this does not look threatening in any way, it is my opinion that you ought to send some one there to fill this crack, thereby preventing the water which is shed from the levee from running into the crack and causing trouble.

I noticed also that the dike across Two Mile Bayou, which was completed not long since, has been washed on the lower land side of the banquette by rains, and seemed to be sieping some. It might be well to watch this place also.

If you should happen to go down the line yourself, you might get out to look at the Bayou Petite Prairie Dike, and notice how the water stands against this dike, both above and below the dike, in comparison to the balance of the line. That portion of the line seems to be low, and should be enlarged and raised the first opportunity. With regards, I am,

Your truly,
GERVAIS LOMBARD,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., November 22, 1906.

Hon. J. C. Cappel, President Board of Commissioners, Saline Levee and Drainage District, Marksville, La.:

DEAR SIR—Your letter of the 20th inst., requesting certain information relative to the Saline Levee and Drainage District, has been received.

In reply, I beg leave to supply you with the following:

First. The report of the Board of State Engineers to the Board of Commissioners of the Saline Levee and Drainage District, at the time of the organization of the latter, estimated the line of levee required from the upper to the lower limits of the district on Red River, at 17.5 miles in length, that such a line of levee would average about 7.0 feet, net, in height, and, built to a grade 3 feet above the highest water of record, on that part of Red River, with a crown 6 feet in width, and side slopes of 3 and 3 to 1, would contain about 750,000 cubic yards, and that the same line of levee, built to the same grade and width of crown, but with side slopes of 2½ and 2½ to 1, would contain about 555,000 cubic yards.

Second. A line of levee extending from the upper end of the district on Red River to a point 14 miles below, on the same bases would contain about 550,000 and 475,000 cubic yards, respectively, the cost of either of which number of cubic yards should not exceed $100,000.

Third. Whether a line of levee 14 miles in length would insure sufficient protection from overflow to the district to immediately safeguard the issue of $100,000 worth of bonds I am not prepared to say.

However, if properly built and maintained, and the line be extended from time to time, greater protection with each extension will follow, and it is generally believed, by the property owners of the district, that an area will finally be annually protected warranting the investment of at least that amount of money.

Conditions in the district must also materially improve with the completion of the levee to close the Bougere crevasse, on the Mississippi River, now under construction by the United States, and still more so, in future years, when the divorcement of the Red and the Atchafalaya rivers is effected—a project which has long been dis-

cussed, and which each year assumes more definite shape and promise of accomplishment.

But, under past and present conditions, whether the line to be built be 17.5 or 14 miles in length, the only part of the district which could, during periods of high water, be annually assured of protection, would be those lying above the lower end of the levee contiguous to the banks of Red River.

Wishing you every success in getting your district in working order in the near future, believe me,

Yours very truly,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., September 15, 1906.

Hon. V. M. Lefebvre and Hon. V. Maurin, Presidents A. B. L. D. and L. B. L. D.:

DEAR SIRS—In accordance with your wishes, I desire to confirm in writing the verbal report which I made to the Joint Organization of the Atchafalaya Basin and Lafourche Levee Boards at its last meeting held in Donaldsonville, La., on August 28th, 1906.

The purport of the verbal report in question was to the following effect: The site for the Donaldsonville Lock, and the plans for same, were selected and made before Bayou Lafourche had been closed by a dam. This site and these plans were submitted to the United States Government and approved by the Secretary of War. Subsequent to that time Bayou Lafourche was closed by an earthen dam, and three high waters have come up against this dam. These high waters have developed that, under pressure from the high river outside, the banks of the bayou and the land slope of the dam sloughed in to a very considerable extent, the banks of the bayou crumbling in and the back slope of the dike falling into the slough, so that on two occasions considerable anxiety was felt as to the safety of the dike.

Under instructions of the Levee Boards, borings were made at the foot of the dike, and it was ascertained that the cause of these sloughs was due to the fact that the bed of the bayou and of the dam was underlaid by a layer of sand more or less coarse, which allowed the water to flow through it freely, and which moved and "flowed" under the pressure due to the high river outside, thereby causing a

cracking and settling of the banks of the bayou and of the dike. It was found that if the bayou were filled back of the dike, and a large banquette built along the land slope of this dike, this movement of material could be very greatly arrested.

Now, under the proposed plan for the construction of the lock, it will become necessary to excavate down to a depth about 15 feet below mean gulf level, or about 20 feet below the present level of the land at the foot of the dike. This excavation will be necessary in order to construct foundations and the concrete floor of the lock. When this excavation is made, there will be a tremendous pressure exerted by the quicksand above mentioned to flow and fill this hole. If this occurs the banks of the bayou and the back slope of the dike will crack and crumble in. On the Atchafalaya Basin side this will not cause very much damage, as there is a rather large bank which can slough in before any property is reached. On the Lafourche Basin side, any cracking and settling of any magnitude will carry in the levee and some of the property which is situated close to the levee at that point; while a slough on the land slope of the dike, at times of high water, would be an exceedingly serious occurrence, which might carry in the back slope of the dike up to the crown and further, thereby breaching the dike. It is useless to try to depict to you the magnitude of such a disaster, should it occur, as it would mean the most disastrous crevasse in the annals of the Mississippi Valley.

It is true that the contractors who would undertake to build the lock would be expected to hold the edges of the pit against such a sloughing, but experience at Plaquemine and elsewhere has demonstrated how difficult this is. In fact, at Plaquemine, it proved impossible, and the material sloughed until it had taken its own angle of rest.

I feel that it is my duty to call this matter to your attention, for I do not think that the Joint Organization of the two Boards in the construction of the lock desire to take any chances whatever which might result in such a disastrous calamity to the two districts.

I really believe that with the presence of a deep pit, such as is contemplated at the land toe of the dike, that there is quite a possibility of some such occurrence, and therefore I want to place the matter plainly before you for your consideration.

Very respectfully yours,

ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., October 15, 1906.

To the Honorable Presidents of the Joint Organization, Atchafalaya Basin and Lafourche Levee Boards:

GENTLEMEN—We beg to report as follows upon the proposals for the construction of a lock at the head of Bayou Lafourche opened by you on October 1st, and referred to the Board of State Engineers for compilation and report.

There was one bid from the Foundation Company for the first ten items, and one bid from the Penn Bridge Company for the eleventh item.

The bid of the Foundation Company for the first ten items amounts to $563,042.50; the bid of the Penn Bridge Company for the eleventh item amounts to $39,900.00, making a total for the eleven items, or for the construction of the lock as advertised, of $602,942.50.

The details for each item have been calculated, and are to be found filled out on accompany form of proposals prepared by your Board for the construction of said lock.

In calculating this total amount, due consideration was given to the additional requirements demanded by the Secretary of War in the construction of the lock and to the changes in the quantities of excavation which have occurred since the time of original calculations. These requirements and these changes somewhat increased the original quantities estimated.

It must be borne in mind that the above amount represents the figures submitted for the construction of the lock proper only. In addition to this, several large items of expense will be required, which are approximately as follows:

It will be necessary for you, after the completion of the lock, to test the gates, to remove the existing dam, to cut a channel from the lock gates to the river, to line the bottom and sides of this channel, and to drive clusters of piles to guide navigation properly and safely in and out of the lock chamber. The expenditures for the above will not be less than $100,000.00, and will vary in excess of this amount in accordance with the character of the work which you may desire to construct.

Under the terms of your advertisement, and in order to properly supervise the construction of the lock, it will be necessary for you to maintain an engineering and inspecting force at Donaldsonville

and also an office for the engineer in charge. We estimate that this item will cost you about $10,000.00 per year, and, of course, the total amount will depend upon the time required to construct the lock.

After the construction of the lock it will be necessary to operate same, to maintain a force for this purpose, probably to purchase electrical power for the purpose of operating the lock gates, to dredge annually the channel from the locks to the river, to do repairs necessary to the locks, which we estimate will cost you not less than $15,000.00 per year.

It must also be borne in mind that the work of the channel dredging which you are now doing will have to be carried on, and probably that this work will have to be continued every year, owing to the sediment which will be brought into the bayou by lockage and the drains which will be opened into it under the laws passed at the last session of the General Assembly.

Again, you are now under an annual expenditure for the care and maintenance of the pumping plant which you have at Donaldsonville, and it is possible that you will have to undergo some additional expenditure in the cutting of additional fresh water canals into Bayou Lafourche.

To resume, it can be safely estimated that the construction of the lock, its test, the removal of the dam, cutting a channel to the river, etc., will cost not less than $703,000, to which must be added an annual expenditure of $10,000 for expenses of superintendence during the period of construction; to these expenses for lock construction must be added the other items of expenditure enumerated above.

Very respectfully,

THE BOARD OF STATE ENGINEERS,

Per ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 21, 1907.

To the Honorable Presidents and Members Joint Organization, Atchafalaya Basin and Lafourche Levee Boards, Donaldsonville, La.:

GENTLEMEN—On the occasion of your regular semi-annual meeting, I beg to submit the following report on the prevalence of salt water in Bayou Lafourche during the present winter.

During the season 1904-05, which was an exceedingly dry one, salt water appeared in Bayou Lafourche. This was due to the fact that there were no fresh water feeders into Bayou Lafourche, and also that prevailing winds caused very high tides in the Gulf, which backed salt water up the bayou during the grinding season, at a time when the mills were abstracting a large quantity of water from the bayou.

During the winter season 1905-06 quite a number of canals had been cut into Bayou Lafourche, one of these, the Lake Boeuf Canal, by your Boards, and many others by private parties. The season 1905-06 was quite a rainy one, and the prevailing winds in the Gulf did not cause high tides, therefore very little salt water ascended the bayou, and little or no annoyance was experienced.

The present season 1906-07 has seen even more canals opened into Bayou Lafourche. This season unfortunately has been a comparatively dry one, and again the prevailing winds have caused high tides in the Gulf, hence during the grinding season, when much water was pumped out of the bayou, salt water ascended this stream, to the great annoyance of the riparian owners.

The following report, which I have made to the honorable chairman and members of the Executive Committee of your joint organization, under date of May 2, 1905, can be appropriately repeated at this time, as it covered the situation thoroughly:

"FRESH WATER SUPPLY.

"In accordance with the law, your honorable body took steps early to provide the bayou with a supply of fresh water. A canal three miles long and containing about 136,000 cubic yards was dug by you, connecting Lake Boeuf with Bayou Lafourche. Since that time a canal connecting Lake Fields with Bayou Lafourche has been opened, and a canal connecting the Acadia Swamp with Bayou La-

fourche is being cut. The Company Canal and the Harang's Canal have been opened into Bayou Lafourche. The above four canals have been cut without expense to your Boards. The Lake Fields Canal is giving, and will give during times of rainfall, a large supply of fresh water to Bayou Lafourche. The Acadia Canal will furnish a moderate supply under similar conditions. The Company and Harang's Canals may be considered of uncertain value, as at times, during periods of drouth, they may be a source of salt water to the bayou, although during periods of rainfall they will also give a fair supply of fresh water to the bayou. Your Boards, however, have wisely surrounded the permission given to open the Company Canal and the Harang's Canal into the bayou by provisions which will exclude salt water from Bayou Lafourche should they become a menace in that direction.

"All of these canals will give a large supply of fresh water to Bayou Lafourche during periods of rainfall, but during periods of drouth they cannot be depended upon for a supply of fresh water, as the basins with which they connect fall, at those times, as low as the level of the Gulf.

"In order to supplement these canals your Boards established a plant of five 18-inch siphons across the dike at Donaldsonville. These siphons run naturally when the river is high, and are assisted by a floating pumping plant, situated at Donaldsonville, during the period of low water. These siphons have a capacity well over 50,000,000 gallons per 24 hours during high water, and the pumping plant was designed so as to give them a 50,000,000 gallons capacity at low water season. Upon test, the pumping plant fell somewhat short of this capacity, delivering 47,439,000 gallons of water over the dike instead of the required 50,000,000 gallons.

"On general principles, although water coming from the Mississippi River is very good and fresh in character, yet it carries with it a considerable amount of sediment, which will be deposited a short distance from the dike, thereby filling up to a certain extent the bed of the bayou and undoing your efforts to dredge out a six-foot channel. It is estimated that 50,000,000 gallons of water at high water season will carry 200 cubic yards of sediment, which will be deposited in the bayou and which will have to be removed by dredge.

"During the winter season 1904-05 an unprecedented condition of drouth prevailed throughout the Bayou Lafourche region. The result was that the Lake Boeuf Canal did not supply any quantity of fresh water worth mentioning. Your honorable body decided to

build a needle dam just above the Harang's Canal, so as to prevent the inflow of salt water into the bayou. The work, however, was begun so late that it was not completed until the grinding season had begun, and a large quantity of salt water found its way up the bayou from the sea before the dam was completed. The erection of the pumping plant was also begun late, the pumps did not begin operating until some time after grinding had commenced, and for two or three months after they began operating the reports show that they never operated more than four siphons, and sometimes only two siphons. Under the circumstances, a considerable amount of salt water was to be found in Bayou Lafourche, extending at times as far up as the Bush Grove Sugar Refinery.

"It would be desirable to make provisions early in the season against a repetition of such conditions. The pumping plant should be put in thoroughly efficient condition early in the season, and should be run by competent men, so that it might operate at its maximum capacity throughout the grinding season. The needle dam should be repaired and put in condition early in the season so as to be efficient if it is needed. The interests controlling the Company Canal and the Harang's Canal should be called upon to provide such gates or needle dams as might be necessary to close their respective canals at once, should they become a source of salt water during the grinding season, and in addition to this an additional source of fresh water should be secured by opening a canal connecting Lake Verret with Bayou Lafourche."

I can see no reason to depart from the recommendations made therein at that time, except possibly to somewhat amplify the plan. The Board of State Engineers holds itself in readiness to submit to you further studies of the subject should you desire it.

In this connection I desire to refute a popular misconception regarding the construction of the proposed locks at Donaldsonville. A large number of persons are under the impression that the construction of locks will insure fresh water to Bayou Lafourche. The impression seems to be that the locks will remain open until such time as there is danger of overflow in Bayou Lafourche, and that they will then be closed. This is an absolutely wrong impression. No locks are, nor can be, successfully operated in this manner in a silt bearing stream. The locks would be kept closed at all times, and only opened, one set of gates at a time, when boats or water craft went through them.

It is obvious that if the locks were allowed to remain open with

a current flowing through them, especially a current carrying silt, it probably would be found impossible to close the gates when it became necessary to do so, the efficiency of the locks being thereby destroyed and resulting in the overflow of the whole country. Again lock gates and their operating mechanism could not possibly stand the strain which would come against them if they were closed against an inrushing current, and they would in all probability be crushed and shattered in the attempt to close them under these conditions, the lock would thereby be destroyed and overflow of the whole country be the result. For the above reasons all locks are kept closed at all times and operated as described above, one set of gates at a time, and only during the passage of water craft. It can be easily understood, therefore, that the locks would admit no fresh water to Bayou Lafourche, except such as would be let in, by one lock full during each passage of water craft through the lock, which amount would be inappreciable.

The construction of openings or conduits through the masonry of the lock would not let in any more water than is now let in by the siphons. Whatever water could be admitted in that manner would be heavily laden with sediment, thereby silting up the bayou and destroying its efficiency for navigation. It is, therefore, clear that the construction of the lock will not in any material way alter the present status of the water supply of Bayou Lafourche and that the remedy must be sought in other directions, as suggested in my former report on the subject, quoted above.

Very respectfully,

ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS
NEW ORLEANS, LA., August 19, 1907.

Mr. J. S. Brady, Chairman, and Members of the Executive Committee, Joint Organization, Atchafalaya Basin and Lafourche Levee Boards, New Orleans, La.:

GENTLEMEN—I beg to inform you that some time ago Captain J. F. McIndoe, Corps of Engineers, United States Army, notified this department that complaint had been made regarding the needle dam situated in Bayou Lafourche, just above Harang Canal. The complaint stated that this was an obstruction to navigation, and Captain

McIndoe, in behalf of the War Department, notified us that this obstruction would have to be removed. I believe that a similar notification was mailed to your secretary, Mr. McCune. Captain McIndoe's communication further stated that in case another dam or lock were contemplated in the bayou in that locality, authority to erect the same would first have to be obtained from the Secretary of War.

Regarding the construction of the Cancienne Canal, I beg to report that the work is progressing very slowly; the teams have done but very little work last month, owing to the fact that the bottom of the canal was so wet that they could not work to advantage. The dredge Hudson attempted two or three times to cut into the canal, but, on account of its limited reach, the material could not be placed far enough from the banks of the canal, and the banks caving in, compelled the dredge to abandon the effort, for fear of being buried by the caves. Mr. Thorgeson, who is under contract to work on the lake end of the canal, has not yet reached the point where the work is to begin with his dredges.

Under the circumstances, it seems to me that the work should be prosecuted in a different manner, and that it cannot be brought to a successful completion as now carried on. It will require land dredges with a long reach, or else floating dredges with a conveyor, so as to be able to deposit the material at a considerable distance from the bank. Should you conclude to build such a conveyor, it is possible that you might operate the dredge Hudson in connection with it; but I believe it would be wiser to advertise the entire work and let some contractor build machinery suitable to construct it. The work is large enough to justify contractors in putting in the necessary machinery, and in that manner the Board could have the work done at a given price, without assuming any risks whatsoever in the construction of the canal.

Very respectfully submitted,

ARSENE PERRILLIAT,
Assistant State Engineer.

ST. LOUIS, MO., June 24, 1907.

To the Honorable President and Members of the Mississippi River Commission, St. Louis, Mo.:

GENTLEMEN—Some two decades or more ago, the condition of the levees above the City of New Orleans were such, that the levees below the City of New Orleans were not subjected to such a high and long period of duration of flood waters, nor had they to withstand the

pounding action of drift logs thrown against them by the waves in the river caused by the displacement of steamships of larger tonnage and greater speed than existed in former years.

Whilst extension, strengthening and betterment of the levee system above the city has gradually advanced, and the flood of 1907 was carried to the Gulf of Mexico without a break in the levees above the City of New Orleans, the work on the levees below the City of New Orleans has not been as progressive. This is due in a measure to the fact that not only are the revenues for levee purposes below the city insufficient to meet the necessary expenditures, but the relative rate of cost of construction has been greater, and the maintenance considerably so.

The construction of levee below the City of New Orleans, with few exceptions, has heretofore been done with wheelbarrows, and wheelbarrow men are getting scarcer every year, for labor as a factor for this character of work has practically gone to fields of more lucrative employment. Contractors with scraper outfits cannot be induced to go below the City of New Orleans for levee work, for the conditions are such that those who have ventured to do so have lost or made no money in their undertaking. All of which contributes to the cause of the high price for levee work below the City of New Orleans. The hopes of the levee authorities below the city are now directed to machine devices to construct their levees, and they are encouraged to learn that steps are being taken, under your direction, by the United States Engineer in charge of the district where these levees are situated, towards the consummation of this plan.

When the Levee Boards below the City of New Orleans were first organized, they issued and sold all of their authorized bonded indebtedness, on which they paid an annual interest of 5 per cent, and with all these moneys on hand, and with the assistance of the United States Government and the State of Louisiana, they raised and enlarged their levees, but their revenues to-day are not sufficient to maintain these levees. The floods of 1897, 1903 and 1907 have proven that their levees are entirely inadequate in section and height, and that they will have to be made higher, stronger and better protected.

The maintenance, care and high water protection of these levees is as serious a factor as the construction of the earthen embankments, and for this reason I believe it would be more economical and the results much better, to proceed with both construction and protection, wherever it is deemed necessary, simultaneously. The method in

vogue at present is to leave the protection of the levees entirely in the hands of the Levee Boards. The consequences are that the Levee Boards, on account of their meagre revenues, will not do the work until there are positive indications that there will be high water, then the material is ordered, the work is hurriedly and inferiorly done, men have to work in water up to their knees, and frequently before the wooden revetment is laid the river slope of the levee is practically washed into, and to restore the slope at low river, the protection has to be removed, and then replaced, which doubles the cost. To-day there are many stretches of levee in these lower districts where the river slope is entirely gone, and there is scarcely any of the crown left; some of these stretches have been built by the United States Government.

In my opinion it would be the better policy, and the most economical in the end, that wherever levee work below the City of New Orleans requires, in the judgment of the Engineers, protection from wave wash, to do this work simultaneously with the construction of the levee. There need not be any unnecessary friction between contractors in laying in the frame work of the wooden revetment and anchoring same while the earthwork is being put in position, and a better job will be insured than when the levee is revetted after completion.

In a great many stretches of levee the life of the protective work will not be over four or six years, for in that period of time a thick willow growth will or can be induced to spread over the foreshore in front of the levee, and willows of medium height, timmed and kept ten feet from the river base of the levee, are the best protection to the levees below the City of New Orleans—wherever there is a thick growth of willows in front of a levee, the logs cannot reach or lodge on the river slope of said levee, and the natural sod will protect the river slope of the levee from ordinary wave wash.

By relieving the Levee Boards of the work of revetting new levees and recent enlargement work, their funds could then be applied to the minor repairs of the levees, such as the cutting out of musk-rat and crayfish holes, the repairs of existing revetments, the cleaning of levees and to the police and high water protection.

The above statement is in a measure but a reiteration of what has been previously presented to the Commission, and is merely a repetition of facts borne out by the experience of this recent high water.

Very respectfully,

SIDNEY F. LEWIS,
Assistant State Engineer and
Member Board of State Engineers.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., Nov. 22, 1907.

To the President and Members of the Mississippi River Commission, On Board Steamer "Mississippi", Vicksburg, Miss.

DEAR SIRS—It is not with the view of seeking immediate further aid from the National Government for Louisiana that the Board of State Engineers, through me, appears before you at this time. Not that it is proposed to permit the National Government to escape further importunities on that score, but because it is well known that practically all immediate allotments possible under existing appropriations have already been made by you.

Whenever understood to be again in funds, you may rest assured that the voice of the State of Louisiana, encouraged as it has always been by you, will be no more silent in the future than it has been in the past.

That which most prompts me to impose upon your valuable time at this meeting, arises from the belief that an intimate knowledge of what is being done and accomplished by all towards promoting and advancing the great work in which we are all so earnestly engaged, is as necessary to the comprehensive administration of affairs as exhibits of and clamors for immediate and future needs.

It is, therefore, my pleasant privilege to present the following facts to you, in the form of what might be termed a progress report on levee affairs in Louisiana, this season.

In a communication to you, last year, the extent of the levee work performed and paid for by the State of Louisiana and the levee districts of the State, from 1865 to 1906, was presented, with the declaration that the willingness of the State to continue to do everything in its power, on about the same scale, to further improve conditions, would ever prove as keen in the future as in the past.

As an evidence of the good faith of this declaration, I beg leave to say that, the contracts in force, at this date, for levee work, proposed to be completed before the close of the season of 1907-1908, payable from funds to be provided by the State and Levee Districts of the State, aggregate 10,650,608 cubic yards of earthwork, to cost $2,548,456.10. Of this 10,650,608 cubic yards under contract at this time, some 4,883,936 cubic yards are in place, as shown by estimates paid to date.

This may not, at first blush, appear to be a very strong showing

in results accomplished for the season, but it must be borne in mind that the active season of 1907-1908 has practically only just well begun.

Following will be found the distribution of this work by districts:

Statement showing, on November 20, 1907, extent and cost of Levee Work under contract by the State and several Levee Districts of the State, and progress made to date:

Work Done	Extent Cubic Yards.	Cost.	Cubic yards in place.	Remarks
TENSAS BASIN LEVEE DISTRICT.				
By the District..	644,000	$158,895.00	152,406	On levees in Ark.
FIFTH LOUISIANA DISTRICT.				
By the State	745,360	170,319.42	587,000	
By the District..	545,900	132,666.60	338,692	
Totals.....	1,291,260	$302,986.02	925.692	
ATCHAFALAYA BASIN LEVEE DISTRICT.				
By the State	372,000	105,110.00	98,621	
By the District..	2,633,664	557,525.98	1,417,863	
Totals.....	3,005,664	$662,635.98	1,516,484	
PONTCHARTRAIN LEVEE DISTRICT.				
By the State	124,000	26,598.00	23,953	
By the District..	235,670	54,229.22	161,667	Increase cost of revetment.
Totals.....	359,670	$80,827.22	185,620	
LAFOURCHE BASIN LEVEE DISTRICT.				
By the State	152,500	36,827.50	12,499	
By the District..	648,762	152,001.88	318,642	
Totals.....	801,262	$188,829.38	331,141	

Work Done	Extent Cubic Yards.	Cost.	Cubic yards in place.	Remarks
LAKE BORGNE BASIN LEVEE DISTRICT.				
By the State	98,462	$24,057.99	6,178	
BURAS LEVEE DISTRICT.				
By the State	97,529	$31,339.28	4,500	Includes cost of revetment.
GRAND PRAIRIE LEVEE DISTRICT.				
By the State	93,373	$26,331.66	7,831	
ORLEANS LEVEE DISTRICT.				
By the District..	588,000	$422,101.70		Includes cost of revetment, piling, retaining wall, reinforced concrete.
PLAQUEMINES PARISH EAST BANK LEVEE DISTRICT.				
By the District..	981,038	$127,394.39	336,838	
By the State	17,000	3,910.00		
Totals.....	998,038	$131,304.39	336,838	
CADDO LEVEE DISTRICT.				
By the State	144,000	$30,257.95	60,000	
BOSSIER LEVEE DISTRICT.				
By the State	250,000	61,000.00	175,450	
By the District..	32,000	4,448.00	9,000	
Totals.....	282,000	$65,448.00	184,450	

SALINE LEVEE DISTRICT.

By the District..	390,000	60,060.00	321,122	

RED RIVER, ATCHAFALAYA & BAYOU BOEUF LEVEE DISTRICT.

By the State	60,000	14,400.00	14,024	
By the District..	597,350	172,221.53	50,250	Includes drainage and cost of clearing.
Totals.....	657,350	$186,621.53	64,274	

RED RIVER AND BAYOU DES GLAIZES LEVEE AND DRAINAGE DISTRICT.

By the District..	1,200,000	$176,760.00	737,400	

RECAPITULATION.

	Extent Cubic Yards	Cost.	Cubic yards in place.
Under State contracts	2,154,224	$ 530,151.80	990,056
Under District contracts	8,496,384	2,018,304.30	3,843,880
Totals	10,650,608	$2,548,456.10	4,833,936

While the levee work involved in the contracts referred to in the foregoing, that is, in force on the 20th day of November, 1907, may, as far as it is possible to judge at this time, be said to cover the most immediate and pressing needs of the levee districts, for the season, projects, as you are well aware, from observation and through the reports of your District Engineer Officers, for the greater improvement of the system throughout must of necessity continue for many years to occupy our serious attention and consideration. There can be no early escape from the ravages of caving banks, in the future any more than in the past, and along a considerable length of line, particularly in the Fifth Louisiana Levee District, and on the "Lower Coast", it has been necessary, by force of circumstances and condition, to so sacrifice section to grade that much enlargement work must of necessity now follow.

Details in regard to locality are not necessary at this time, but will, of course, be presented, from time to time, as occasion may demand and permit.

One of the most interesting factors, from the physical as well as the economical point of view, entering into the discussion of the problem of ultimate levee development is, of course, ***grade.***

To neither view of the subject can justice possibly be done in this communication, and no attempt to do so will be made.

However, as present grades bear so strong a relation to the question of ultimate grade required, I have thought it would not be uninteresting to compile a statement, based upon the latest information obtainable, showing, in miles and percentages, what the relation between the present grade of levees and high water, on the Mississippi River, in Louisiana, exclusive of the Orleans Levee District, treated further on as a separate proposition, will be when the work of the present season outlined herein, has been completed.

This I submit to you below, for comparison with your own data, and for such service as you may find it to be to you.

Tabulated Statement showing, in miles and percentages, the relation between grades of Levees and High Water on the Mississippi River, in Louisiana:

Levee District.	At about H.W. Miles.	0 to 1′ Above H.W. Miles.	1′ to 2′ Above H.W. Miles.	2′ to 3′ Above H.W. Miles.	3′ to 4′ Above H.W. Miles.	4 Feet & over Above H.W. Miles.
Fifth Louisiana District						
U. S. Lower Tensas ...			14.7	15.7	43.6	15.4
U. S. Upper Tensas ..			2.3	53.2	45.4	45.5
Atchafalaya Basin				1.6	17.4	109.1
Pontchar'rain				12.5	66.6	46.5
Lafourche		1.6	6.1	24.8	58.7	28.2
Lake Borgne Basin		1.8	8.8	19.5	18.0	
Grand Prairie	2.3	10.4	6.1	3.5	7.9	
Buras	2.4	14.8	10.9	4.4	1.6	
Totals	4.7	28.6	48.9	135.2	259.2	244.7

	%	%	%	%	%	%
Fifth Louisiana Levee District						
U. S. Upper Tensas ..			1	37	31	31
U. S. Lower Tensas ..			16	18	49	17
Atchafalaya				2	13	85
Pontchartrain				10	53	37
Lafourche		2	5	20	50	23
Lake Borgne		4	18	40	38	
Grand Prairie	7	35	20	12	26	
Buras	8	44	30	13	5	
Percentages of whole line	1%	4%	7%	18%	36%	34%

In the Orleans Levee District, an inspection of its lines of levee, during the high water of this year, showed the following:

"Of the 13 miles of levee on the left, or east bank, 3 per cent of the length of line is from 3.5 to 4.0 feet above the highest water of record (1903); 38 per cent from 3.0 to 3.5; 17 per cent from 2.5 to 3.0; 5 per cent from 2.0 to 2.5; 12 per cent from 1.5 to 2.0; 4 per cent from 1.0 to 1.5; 4 per cent from 0.5 to 1.0; 7 per cent from nothing to 0.5; while 3 per cent is from nothing to 0.5 feet below the high water of 1903; 7 per cent from 0.5 to 1.0; 1 per cent from 1.0 to 1.5; and 1 per cent from 1.5 to 2.0 feet below the high water of 1903.

"Of the 14 miles on the right, or west bank, with the exception of a number of noticeable short stretches along the commercial front, the line of levee in the Parish of Orleans will average generally fully 2.0 to 3.0 feet above the high water of 1903."

On the Red and Atchafalaya Rivers the levees stand nearly uniformly three feet and over above the high water, with fairly good proportionate sections.

The lines of levee in the Orleans Levee District were shown by the inspection referred to, as far as grade is concerned at any rate, to be far inferior to any other lines of levee in the State as a whole, except possibly the Grand Prairie and Buras Levee Districts, on the "Lower Coast", in Plaquemines Parish.

As a consequence of low grades, and other serious defects, here and there, in the lines of its levees, the Orleans Levee District has, this season, in response to popular demand, inaugurated a movement to improve and maintain its line of levee to standard grades and sections.

Impressed with the view that materially increased flood elevations

may in the future be expected on the lower river, together with the knowledge of the extreme wear and tear to which embankments along its front must be subjected in the operations of shipping and commerce, the necessity for the construction and maintenance of embankments of a superior order presented itself, resulting in the adoption of a general formula to govern in the construction of levee lines for the harbor. Easy slopes to facilitate approach to the wharves and sheds for shipping had also, of course, to be taken into consideration.

Thus, in general terms, this formula proposes an embankment to be built and maintained to a grade not less than five (5) feet above the high water of 1903, with a crown not less than fifty feet wide, river side slope not steeper than three horizontal to one vertical, and land side slope not steeper than ten horizontal to one vertical, the flattening of slopes beyond this to be governed by the special needs of localities.

Such an advanced proposition was believed to be warranted by the magnitude of the interests involved in the district, and the belief that its line of protection against overflow from the Mississippi River should be placed upon the most unassailable plane that could be designed and practically and comprehensively carried out by the district.

In view of the great betterment proposed and being gradually carried on by the Levee Districts throughout the State, any grade and section less than that recommended was not, in the opinion of local authorities, believed to be materially superior to other improved lines of levee in the State.

The final cost of the project cannot well be estimated, at this time, but, including payment for property appropriated, must reach into several million dollars, the work under contract on these lines, for this season alone, already summing up over $42,000, and payments for property involved to at least three times as much more.

This question of appropriation of property, in the limits of the harbor of the City of New Orleans, it will thus be seen, from experience at the very inception of the project, shows the necessity of locating the proposed levee improvements as close to the edge of the banks of the river as practicable, and conditions justify.

The project, therefore, contemplates establishing, as nearly as possible, throughout the harbor, fixed lines, to which to build.

Along the greater part of the lines of the harbor, the banks of the river are sufficiently stable, and give sufficient promise of future stability, to warrant this. But, along many other stretches in the

harbor, they are far from stable, and, under such circumstances, to proceed with a project for levee improvement on such an advanced plane, as that proposed, except in conjunction with comprehensive works of bank protection is, to say the least, extremely questionable.

It must, however, be recognized that this character of work, under any circumstance, is manifestly beyond the resources and scope of the Orleans Levee District. When considered in conjunction with the extent of the levee improvements proposed, it is prohibitive.

However, so popular and justified is the demand for the improvement of the river front on the lines set forth, that the Orleans Levee District has proceeded, in advance of any direct assurance of securing bank protection, to carry out the project, believing that the National Government will be induced to come to its rescue in that respect, before any very great loss can occur from the movement of the bank to such work as it may in the meantime hope to execute.

Thus, a number of localities in the harbor have already been selected for treatment, under locations, plans and specifications approved by the Board of State Engineers of Louisiana, at which work is already under way.

In approving these locations, the Board of State Engineers has, in each instance, been influenced by the belief entertained by the Orleans Levee District that bank protection, where needed, would follow. In fact, unless this promptly be the case, the locations approved by the Board of State Engineers are, in several instances, in no way justified. This is especially true in regard to locations in the Third District of the City, where, without bank protection, the levee improvements contemplated are doomed to failure.

Thus, a strong movement has been inaugurated in the Orleans Levee District to impress upon the National Government the necessity, urgency and justice of assisting the Orleans Levee District in this gigantic work which it has on hand, by at least providing the means for and directing the construction of the bank protection needed to make its work of protection from overflow an unqualified success throughout its jurisdiction.

As the approval of any such line of work will so largely depend upon the views entertained by your Honorable Body, the Board of State Engineers ventures to express the hope that its necessity will appeal to you forcibly, and enlist your generous co-operation and assistance.

As also already declared, in previous considerations of this subject, it is a well known fact that the Orleans Levee District is of record

as announcing that if the National Government will only undertake the task of bank protection within the limits of its harbor lines, it will construct and maintain all the levee lines demanded.

In the communication of last year, already referred to, the question of grade was touched upon, with special reference to the levees extending from the vicinity of the Arkansas line to Delta, La., and from about New Orleans to the Gulf.

The Board of State Engineers holds, at this time, the same views on this subject as then expressed, hoping earnestly to see the provisional grades already adopted along those parts of the Mississippi River materially raised.

The State of Louisiana is, upon all occasions where new work is undertaken, and the means permit, itself materially improving upon the provisional grades heretofore followed.

Another matter upon which some stress was laid in the same communication, was in regard to revetments, to protect the levee lines on the "Lower Coast", from wave action, caused by high winds and the passage of ocean steamers.

In regard to this the following was then said:

"It, therefore, appears to the Board of State Engineers that the protection of the lines of levees below New Orleans, by revetments constructed under approved plans and methods, should, wherever known to be necessary, be, in the future, considered as a material part of their construction, in order to better insure their efficiency, as well as their preservation and maintenance."

What the Board of State Engineers then *preached*, it is, I am pleased to say, now practicing, by letting out and including in the contracts for levee work on the "Lower Coast" this season, revetments, where known to be necessary. This is quite a departure from the practice of the State, but now recognized to be essential.

While on the subject of the "Lower Coast", it must unfortunately be further said that conditions along that part of the river are not materially improving as a whole, and no really satisfactory results can, from the present outlook, be generally expected within the near future. The work projected for improving conditions there does not seem to appeal to contractors, and, in spite of the inducements offered, it is difficult to secure them, and, when secured, even more difficult to get them to execute their contracts. Local conditions and surroundings there appear to be opposed to team work, barrow men grow scarcer with each season, and machinery has so far done but little towards filling the bill.

It would appear that a special study of requirements on the "Lower Coast" and the methods and means necessary to provide them should without delay occupy the minds of those in control, if material and beneficial ends are to be hoped for in anything like the near future.

Very respectfully,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 30, 1906.

Dr. W. D. Haas, Bunkie, La.

DEAR DOCTOR—In compliance with your request to me, a month or so ago, to write you, by the 1st of May, if possible, on the subject of improving Bayou Boeuf, with special reference to drainage, and, incidentally, to the possibilities for navigation for small craft on Bayou Boeuf, I take pleasure in submitting the following, with accompanying map, showing, in a general way, the territory traversed by Bayou Boeuf, and that immediately contiguous to it, to the east and to the west. The map also illustrates in an equally general way, a tentative amplified project for complete protection from overflow from the Red and Atchafalaya Rivers, in Rapides, Avoyelles and St. Landry Parishes, and substantial relief from surplus precipitation within their limits, described later on. I would, however, in advance impress upon you that the project, as hereafter so outlined, is herein treated only in a most cursory way, and may be subject to many changes in the light of closer examination, survey and study, especially in the matter of the routes of drainage channels, of which there are any number in the basin from which to select, according to favorable or unfavorable topographical features, best demonstrated by surveys and levels.

I will add that the map was not prepared for this occasion, but for a previous explanation on similar lines, and has only been hurriedly added to for purposes of illustration in the present instance.

For effective results in drainage, this territory, traversed by Bayou Boeuf, and immediately contiguous to it, to the east and to the west, between Red River, the Atchafalaya River, and Bayou Courtableau, should probably be separated into three systems, the dividing lines being Bayou Boeuf and the Bayou des Glaizes. However, as two

of the systems—those two divided by Bayou des Glaizes—must converge before reaching the point of final delivery—Bayou Courtableau —two would be better, and, as all three must eventually, if the project be carried out in its entirety, depend upon one ultimate outlet—the Little Bayou Teche—one general comprehensive system appeals even more strongly to me.

Of course, the drainage of all the rain sheds east of Bayou Boeuf over to the Avoyelles Prairies and Bayou des Glaizes, should continue to be carried by the main arteries already established by the Red River, Atchafalaya and Bayou Boeuf Levee District, in the basin between Red River and Bayou Boeuf, from Alexandria to the Atchafalaya River, via Chatlin's Lake, Boating Bayou (or Bayou Lamourie), Three Prong Lake, Bayou du Lac, Pearl Lake, Little Bayou des Glaizes, to "The Junction", and thence by way of Bayou des Glaizes proper, as long as Bayou des Glaizes proper remains open, and delivers into the Atchafalaya River; or, in the event of the closure of the latter, in the future, then by way of Bayou Rouge, from "The Junction", to the State Canal, parallelling the Atchafalaya River, and thence by said canal, and the succession of channels below it, when improved, to Bayou Courtableau. This, we will term, for present convenience, Drainage System No. 1.

Drainage System No. 2 should consist of the territory now embraced in the Red River and Bayou des Glaizes Levee and Drainage District, generally lying between the Avoyelles Prairies, Red River, the Atchafalaya River and Bayou des Glaizes, to the "Long Bridge". The treatment of this system is entirely dependent upon developments in levee building, and effecting co-operation on the questions both of levee building and of drainage, with the Red River, Atchafalaya and Bayou Boeuf District, when, upon agreement, its drainage should be directed into Bayou des Glaizes, and delivered through System No. 1.

The drainage of the rainsheds usually seeking Bayou Boeuf, from its western slope, should be carried by Bayou Boeuf direct to the Courtableau, all openings or outlets from Bayou Boeuf, through its eastern bank, to be permanently closed—especially Bayou Lamourie. Let us term this Drainage System No. 3.

Drainage System No. 4, south and west of the Courtableau, would, in time, follow.

Good progress has already been made in improving drainage in System No. 1, described. It only remains, therefore, to inaugurate the improvements necessary for Systems Nos. 2 and 3, and then to continue, each in its order, to improve all, until such time as good

results will prove not only general in all, but satisfactory in every way in all.

This, however, can only be accomplished in anything like a comprehensive way, and within anything like a reasonable time, by the organization of drainage districts for each system, operated upon financial lines entirely separated from the levee systems protecting them from overflows from high waters in the streams bordering the Red River, Atchafalaya and Bayou Boeuf Levee District. The latter already has more than it can accomplish, with the means at hand, in extending and maintaining the lines of levees upon which not only the protection of the country from floods now directly depends, but without which none of the drainage herein discussed for the systems described would be of any practical use, or its success in any way assured.

In addition to the large sums of money placed in the lines of levee already built, the Red River, Atchafalaya and Bayou Boeuf Levee District has, to date, expended $255,495.36 in establishing 61 miles of main drainage arteries in System No. 1, and, before the district can even satisfy the continued appeals for further improvement in this direction from communities realizing the great benefits derived from the work so far done, it cannot hope to escape the expenditure of probably as much more. To meet this, and continue to safeguard the district from high water from the Red River and the Atchafalaya River, is not possible with the limited means at the command of the district.

If, therefore, this subject is to be considered seriously, the first proposition before you is the consideration and organization of the necessary drainage districts, in which connection, I will repeat, the larger the territory in each distict, all things being equal, the better.

In its recent biennial report to His Excellency, Governor N. C. Blanchard, the Board of State Engineers in treating of drainage, says:

"To go further into the matter the Board of State Engineers also feels called upon to express an opinion adverse to the present tendency to organize small drainage districts, so far apparently appealing to localities.

"It is not believed that the formation of small drainage districts anywhere can ultimately prove satisfactory. On the contrary, it is believed in the very nature of things, that they will eventually prove sources of serious conflict, controversy and complications. Again, the question of revenue, in the case of drainage districts of limited extent of territory, is, under existing laws, further adversely affected,

unless a very great enhancement of values, after the inauguration of the system of drainage, should follow.

"Finally, it appears to the Board of State Engineers, that in order to comprehensively and successfully systematize the ultimate drainage of the State, all drainage projects should be submitted to a properly organized and qualified commission, with ample appropriations for expenses, to consider the merits of drainage districts locally, and their future bearing and effect on other projects in operation or likely to be considered.

"For localities of limited area to proceed with plans for drainage in which local interests purely are considered, and the general topographical features of the drainage basins in which they may be situated are overlooked, injurious consequences to others in the basin must eventually result and reflex complications to themselves, as well."

This report of the Board of State Engineers goes very fully into the question of drainage, and I will take pleasure in forwarding you a copy, as soon as received from the printers.

Considerable reliable information as to extent of line, elevations, etc., for Systems Nos. 1 and 2 is already at hand, but not so for System No. 3.

However, sufficient information has been obtained to establish the following approximate figures in connection with the latter.

Length of Bayou Boeuf requiring improvement about 125 miles, slope from head of Bayou Lamourie to Bayou Courtableau—about 90 miles—about 40 feet, or an average of say 0.45 foot per mile. This, with proper treatment and distribution, is ample slope for good results in drainage, and an ideal one for slack water navigation.

To sum up the matter, it is my opinion that the parishes of Rapides, Avoyelles and St. Landry possess natural features inviting an ideal plan for protection from overflow from the Red and Atchafalaya Rivers, during high water in those streams, as well as for drainage; and, with your permission and patience, I would outline two general projects, which, in my mind, if carried out in comprehensive and timely ways, divided into, first, levees, and second, drainage, should, I think, command the attention of all interested viz.:

LEVEES.

1st. A continuous line of levee from the highlands on Bayou Rapides, down Bayou Rapides to Red River, thence down Red River to the Avoyelles Prairies, at David's or Moncla's Ferry;

2d. Down Red River to the head of the Atchafalaya River, and,

3d. Down the Atchafalaya River to the vicinity of Butte a la Rose, crossing and closing Bayou des Glaizes and Bayou Courtableau.

The aggregate length of these three lines is about 185 miles. Line No. 1 is already constructed and in good condition; Line No. 2 is under way, with some 12.5 miles nearing completion; and Line No. 3 is built and in good condition, from the mouth of Bayou des Glaizes to a point about 7.5 miles below Melville. That is about 85 miles of the 185 miles of lines required are already in existence.

Drainage Channels.

1st. The rectification and improvement of Bayou Boeuf, from its head near Boyce, La., to the Courtableau.

2d. The improvement of the existing chain of drainage channels from Alexandria to Bayou des Glaizes.

3d. The rectification and improvement of Bayou Rouge, from "The Junction" to the State Canal, parallelling the Atchafalaya River.

4th. The opening up of Yellow Bayou, at its departure from Bayou des Glaizes, about three miles above Simmsport, and its rectification and improvement and connection with Turner's Bayou.

5th. The improvement of the present chain of drainage channels from Mill Bayou to Bayou Jack, via the Coulee, Choupique Lake, Turner's Bayou and Woodside Canal.

6th. The rectification and improvement of Bayou Jack to Bayou Rouge.

7th. The rectification and improvement of the State Canal, Burton Lake, Half Moon Lakes, Swazee Lakes, Bayou Latanier and the Big Gras to Bayou Courtableau, with possibly a lateral connection between Bayou Rouge and Bayou Boeuf, about opposite the mouth of Bayou Jack.

8th. And finally the rectification and improvement of Little Bayou Teche into Bayou Teche proper.

Of this, but a small part of the work required has yet been undertaken, namely in System No. 1.

Anything like a close estimate of the remaining cost of such a general project is not possible at this time, with the data at present at hand, but it should certainly not prove out of proportion to the great benefits that would result to such an extensive and valuable expanse of territory. Concert of action being assured, and technical details for the formulation of plans obtained to successfully treat it, as outlined,

no part of the State of Louisiana could be made more immune from the dangers of overflow, and the disadvantages of inadequate drainage, than the three parishes of Rapides, Avoyelles and St. Landry, nor compare with them in fertility and richness.

I have hastened this letter to some extent as I noticed in one of the dailies, here in New Orleans, within the last month, a statement that a convention to consider the improvement of Bayou Boeuf, etc., had been called to meet at Bunkie, La., on May 4th, and I thought you might possibly like to have before you some such outline of the subject as is herein attempted.

But for the fact that a previous important engagement at Shreveport, for to-morrow, takes me away to-night, and will require my presence up Red River until at least next Saturday, I would take pleasure in being with you on the date mentioned.

Hoping, nevertheless, that this rather superficial resume of a very important subject and a rather large project, may prove of service to you and our friends interested, believe me, always,

Yours very truly,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., May 23, 1906.

Hon. W. H. Scheen, Mayor of Coushatta, Coushatta, La.

DEAR SIR—In compliance with your request of May 9, that the Board of State Engineers make an inspection and report upon the condition of, and the proper remedy for the caving of river banks, which threaten the upper end of your town, I visited the locality on the 19th inst., and beg leave to report as follows:

The caving which is in process on the right descending bank, just above a point opposite Coushatta, has progressed sufficiently to indicate its probable development in the near future, with consequent effect upon caving on the Coushatta side of the river. Unfortunately, the concave shore line on the right bank is so shaped that the current will cause the point at the lower end of this curve to cave off rapidly, thus steadily transferring the point of attack on the Coushatta side further down stream, and that means ultimate rapid caving along the entire front of your town.

The only remedy which we can suggest to you as being practicable is the employment of a system of bank protection, such as the Federal Government constructs, along such places in the Mississippi River and other silt bearing streams, namely a continuous mattress of either willow brush or lumber, loaded with stone, completely covering the caving bank and protecting same from further erosion.

The cost of this class of work would, no doubt, be beyond your means, and could be borne only by the National Government. The National Government has not heretofore undertaken such work anywhere, unless the caving threatened to so change the regimen of the river as to interfere with navigation, or to cause a greater expenditure for levees or other public utilities than the protection work would cost. Extraordinary damage from overflow to a section of country not heretofore subject to damage might also appeal to it.

The fact that the caving has aleady reached so far back into Coushatta Bayou as to threaten to break into Bayou Nicholas, near its source, may present such serious features, in the shape of overflow and diversion of great volumes of water from the main river channel, as to call for earnest consideration from the Federal Government. In this connection I might add that while I did not visit the locality just below Coushatta, it appears by reference to a map of that section that the river is caving towards Bayou Nicholas just below the town also.

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per GERVAIS LOMBARD,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE STATE BOARD OF ENGINEERS,
NEW ORLEANS, LA., March 22, 1907.

Dr. Ashton Blanchard, Health Officer, City of Shreveport, Shreveport, La.

DEAR SIR—The pressure of certain immediate official engagements has compelled me to defer, much longer than I had intended, writing to you, as promised, in regard to the result of my observations on and preliminary investigations into the subject of the present and future source and supply of water for domestic and other purposes for Shreveport, made in company with you and a committee from the City Council of Shreveport, last week.

A conference was held, at your office, on my arrival in Shreveport, on the 14th inst., followed, the next day, by an inspection and discussion of the entire present situation, and of future contingencies and possibilities, on a trip by boat to Twelve Mile Bayou, as far up as "The Pass'.

On this trip there were present Messrs. Conger, Emery and Jordan, of the City Council of Shreveport, Mayor Bernstein, City Engineer Martin, Superintendent Keene of the Shreveport Water Works Company, a representative of the Shreveport Times, yourself and myself.

The conference at your office on the 14th inst., the trip to Twelve Mile Bayou on the 15th, and the further personal investigations made by me on Sunday, the 17th inst., conclusively demonstrated to me not only that a change of location in the present intakes, low service pumps, etc., but of the direct source of the supply of water for Shreveport itself, would be greatly needed in the very near future, not to enlarge upon the greater necessity for these changes, which, in the course of time, the assured steady growth of Shreveport, would unquestionably demand.

As I understood it, after reaching Shreveport and conferring with you, it had so far only suggested itself to those already investigating the matter that the immediate source of supply should, on account, at times, of the stagnation, and, due to sewerage, drainage, refuse, waste, etc., the pollution even, of the pool in Cross Bayou, from which the present water supply of Shreveport is drawn, be moved to a point more distant from the corporate limits of Shreveport, and, with this deduction in mind, the selection of one of two localities for intakes had been discussed. One of these localities was situated on or near the west bank of Twelve Mile Bayou, some seven miles, by the present accepted channel of the bayou, or 3.75 miles, in a direct line above Shreveport. The other locality was on or near the banks of Clear Lake, some 28 miles by the present recognized intervening channel, such as it is at times, above Shreveport. Both localities primarily entail, by reason of distance, a great expense in the way of pipe laying, removing pumping plant, operation, maintenance, etc.

The actual source of supply in each case remained the same as at present, with its attendant filtration and purification, that is, the comparatively limited watershed between Red River to the east, the highlands to the west, and Marshall, Texas, to the north, and Shreveport, La., to the south, coupled at times, with back water from Red River. The only advantage thus promised, under either of these propositions, was, therefore, simply in the removal of intakes

to points beyond any immediately contaminating and polluting influences from the sewage disposal and waste of Shreveport.

It was apparent also that, to at all times control the discharge from these sources, even for the present needs of Shreveport, would involve the construction of a dam or dams across certain natural waterways, to permit which National legislation, with its attendant examinations, delay, and doubtful outcome, would have to be invoked, not to mention the opposition likely to be aroused by the prejudices and antagonisms of property holders above the dam or dams, already much disposed to believe that any such recourse must impair drainage.

When all this was placed in the scale with a proposition which presented itself to draw the supply from a source of constant flow and unlimited discharge, compared with any possible requirements, present or future, subject to no restrictions by the National Government, conflicting with no private interest, and apparently possessing no deleterious properties that could not be removed, there seemed little room for further argument.

The source thus presenting itself was Red River. The advantages of obtaining a water supply for Shreveport from Red River may be summed up as follows, viz.: the flow is constant and the discharge, without resort to extraneous measures, assured. The population throughout its watershed is comparatively small, and no cities or commercial enterprises of any great extent occupy its banks above Shreveport, leaving it thus, throughout its great length of over 900 miles, free from sewage pollution, with every opportunity in its long run for self purification, if necessary, and for freeing itself from any germs of infectious diseases, if present.

As to the purity and healthfulness of the water, however, an analysis by a specialist in that line of inquiry can be had. If any analysis demonstrates that the water of Red River is hygienic, or can be rendered so without recourse to extraordinary means, there should remain little if any room for doubt as to the course that should be pursued. The removal of any excess of suspended matter, and any purification and softening of the water that may be required, would simply be a matter of scientific detail and treatment, the possibilities of which, in the light of modern practice, are almost limitless.

I would, therefore, recommend that a thorough chemical analysis and bacteriological study, by accepted authorities, be made of the water in Red River, taken from some point about midstream, near the surface and near the bottom of the channel, at a medium stage

of the river, as exists at present, above the corporate limits of Shreveport, and, if no seriously objectionable properties be discovered affecting it, that it be adopted as the source from which to draw the future water supply of Shreveport.

There may be, without a proper study of the subject, a prejudice in the minds of many against the use of Red River water for domestic purposes. But this prejudice is not supported by facts. To my personal knowledge, the past and present water supply of Shreveport has been and is largely affected by Red River, beginning with little or no material proportion, at stages below 10 feet on the gauge at Shreveport, and increasing to greater and greater proportions, as the river rises, until, at flood stages, Red River water predominates, and is served to the patrons of the Shreveport Water Works Company, without protest, as far as my knowledge extends.

In this connection I would furthermore recommend, if the change be decided upon, that the location of the intakes and low service plant be made at a point on or near the right descending bank of Red River in the vicinity of the mouth of the lower arm of "Old River", generally but erroneously called the mouth of Twelve Mile Bayou, something more than three-quarters of a mile, by river, above Shreveport, and at a distance from the present site of the Shreveport Water Works Plant of something less than one mile, on an air line. If a location reasonably safe from caving banks cannot be secured, or made secure by revetment, or otherwise, on the right descending bank of Red River in that vicinity, no obstacle, except some increase in cost, should present itself to placing the intakes and the low service plant on the left descending bank of Red River, about opposite the same point, where the stability and life of the bank seems assured for a very long time to come.

I enclose you with this a sketch showing, tentatively and approximately, the relative locations of the present Shreveport Water Works plant, Twelve Mile Bayou, as far as under consideration, and Red River, with the suggested new locations for the intake and low water service plant, and the line of pipe to connect the latter with the present high service plant, reservoirs, settling and filtering basins of the Shreveport Water Works Company.

If there be any further service which I can, without interference with my official duties, render you, or any special line of inquiry into the premises about which I can inform you, you have but to so express yourself, and it will give me pleasure to do all in my power to accommodate you. Yours very truly,

FRANK M. KERR,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE STATE BOARD OF ENGINEERS,
NEW ORLEANS, LA., Oct. 22, 1907.

Mr. G. R. Taggart, Clerk to Commissioner, Department of Commerce and Labor, Bureau of Corporations, Washington, D. C.

DEAR SIR—Your letter of the 17th requesting, on the part of Mr. Herbert Knox Smith, Commissioner of Corporations, and member of the Inland Waterways Commission, information as to the operations of this State and of the levee districts of the State, in financing levee building along the Mississippi River, has been received.

Following the line of inquiry presented by you, I beg leave to submit the following:

"(a) A brief description of your system of taxation for levee building and maintenance—the per cent of tax laid, the property it covers, that is, whether real estate, personal estate or any other subject matter."

Answer: The system of taxation for levee purposes in Louisiana is as follows:

1st. A general ad valorem tax, known as the "General Engineer Fund", levied and collected annually on all property, real and personal, within the limits of the State, whether subject to overflow or not. This tax is part of the general annual State tax of five mills on the dollar, assessed and collected on all property, real or personal, in the State. Previous to the year 1906, the general State tax annually imposed was six mills on the dollar, but this rate was that year reduced by Legislative enactment to five mills on the dollar. When the rate for the general State taxes was six mills on the dollar, one mill was required to be annually set aside and expended for levee purposes. Now that the rate is reduced to five mills on the dollar, seventeen-twentieths of a mill is required to be so set aside.

At one time considerable money accrued to the levee funds from the sale of overflowed and swamp lands donated, for levee and drainage purposes, to the State by the United States, and then by the State to the Levee Districts in which such lands might be located. Previous to the incorporation of the levee districts, all sums accruing from the sale of such lands, after deducting the expenses of the State Land Office, were transferred to the "General Engineer Fund". Since the incorporation of the Levee Districts, only such sums accruing from the sale of such lands located *outside* of the incorporated Levee Districts is so transferred.

Most of such lands, however, have now been sold, and only occasional sales occur, when forfeited for taxes, or on account of improper entry, etc. While, at times, contributing materially to the General Engineer Fund, the sale of overflowed and swamp lands has become an uncertain source of revenue, and is, therefore, not taken regularly into account in summing up resources.

2d. The State is divided into a number of "Levee Districts", selected geographically, with special reference to such natural features as, from the point of view of protection from overflow, would tend to render the *one* more or less independent of conditions in the others.

There are, at this time, eighteen such levee districts in the State, bodies politic with corporate powers, authorized and empowered to annually levy taxes upon all property within the boundary of the district, real and personal, to issue bonds, bearing interest at 5 per cent and 6 per cent per annum, and running from twenty to fifty years, and all but one of them to levy "forced contributions" on acres of land, on miles of railroads, and on all products raised within the limits of the districts. The one exception is the Orleans Levee District, covering the entire corporate limits of the City of New Orleans. District taxation for levee purposes in this District is limited to an annual ad valorem tax of one mill on the dollar.

In two of the other seventeen districts—the Tensas Basin Levee District and the Red River, Atchafalaya and Bayou Boeuf Levee Districts—authority to levy "forced contributoins" is limited to lands and railroads.

The District taxes and forced contributions permitted by law, in the Levee Districts referred to, are as follows:

Tensas Basin Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; $60.00 per mile of standard gauge railroad within the district; and $30.00 per mile on railroads of less than standard gauge.

Fifth Louisiana Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; $100.00 per mile on railroads of standard gauge; $20.00 per

mile on railroads of less than standard gauge; and $1.00 per bale on cotton grown within the district.

Atchafalaya Basin Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 2½ cents per acre on all land within the district; $60.00 per mile of railroad line; 25 cents per 1,000 lbs. of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 4 cents per ton of cane when same is removed from the limits of the district and beyond the limits of any levee district in this State; 25 cents per bale of cotton; 2 cents per 100 lbs. of seed cotton when same is removed from the limits of the district and beyond the limits of any other levee district of this State; 1¼ cents per sack of rough rice.

Pontchartrain Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 3 cents per acre on all land within the district other than that cultivated in sugar, cotton or rice (excepting swamp lands subject to tidal overflow), 15 cents per barrel of sugar; 50 cents per hogshead of sugar; 5 cents per barrel of molasses; 3 cents per sack of rough rice; 50 cents per bale of cotton; 7½ cents per ton of sugar cane grown in the district and removed therefrom before being converted into sugar; 4 cents per 100 lbs. of seed cotton grown in the district and removed therefrom; $100.00 per mile of main line of railroad.

Cat Island Levee District.

(Not in active operation.)

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 2½ cents per acre on all land wtihin the district; $100.00 per mile on all standard gauge railroads; 50 cents per bale of cotton; 20 cents per barrel of sugar; 70 cents per hogshead of sugar; 15 cents per barrel of syrup; 10 cents per barrel of molasses; 5 cents per sack of rough rice; ½ cent per bushel of esculents and 2½ cents per barrel of oranges.

Lafourche Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 2½ cents per acre on all land within the district; $100.00 per mile on all standard gauge lines of railroad operated by steam within the district, excepting railroads whose total length in this State is less than 100 miles, which latter are taxed at the rate of $50.00 per mile; 10 cents per barrel of sugar; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; and 2½ cents per barrel of oranges.

Orleans Levee District.

Tax: Ad valorem tax of 1 mill on the dollar on all property situated within the district, subject to overflow.

Lake Borgne Basin Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents on each and every acre of land susceptible of cultivation within the limits of the district; $60.00 per mile of railroad line; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 10 cents per barrel of sugar; 7½ cents per barrel of syrup 5 cents per barrel of molasses 2½ cents per sack of ough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges produced in said district; and 1½ cents per barrel of oysters gathered from the waters within the limits of the district.

Grand Prairie Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: $1.00 on every arpent front of land within the district facing the Mississippi River; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of esculents;

5 cents per barrel of oranges produced within the limits of the district, and 3 cents per barrel of oysters gathered from the waters of the district.

Buras Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre of land susceptible of cultivation within the limits of the district; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 5 cents per ton of sugar cane; 5 cents per sack of rough rice; 2½ cents per bushel of esculents; and 5 cents per barrel of oranges.

Plaquemines Parish East Bank Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district. The act of incorporation provides that the district may raise the ad valorem tax to 50 mills on the dollar, if a proposition to do so be submitted to and endorsed by the taxpayers, in accordance with Article 239 of the constitution of 1898.

Forced contributions: $1.00 per acre on all lands within the district protected from inundation, lying between the Mississippi River and Gulf Coast Levees; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of vegetables and fruits other than oranges; 5 cents per barrel of oranges.

Bossier Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents on every acre of land in the district; $60.00 per mile of railroad within the district; 50 cents per bale of cotton.

Caddo Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property in the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

Red River Atchafalaya and Bayou Boeuf Levee District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; $60.00 per mile of railroad within the district.

Courtableau Levee District.

(Not in active operation.)

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; and 5 cents per barrel of rough rice.

Red River and Bayou des Glaizes Levee and Drainage District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

Saline Levee and Drainage District.

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 5 cents per acre on all land within the district; $60.00 per mile of railroad within the district; 50 cents per bale of cotton.

North Bossier Levee District.

(Not in active operation.)

Tax: Ad valorem tax of 10 mills on the dollar on all property within the district, subject to overflow.

Forced contributions: 15 cents per acre on all land within the district; $100.00 per mile of railroads within the district; $1.00 per bale of cotton.

A unique feature in the act of incorporation of one of the Levee Districts—the Tensas Basin Levee District—is the authority to expend its revenues on levee work not only outside of the *district,* but

outside of the *State* as well. This is due to the fact that the district is more exposed to overflow by flood waters escaping from the Mississippi and Arkansas Rivers, in Arkansas, than from any other source, and its work is, therefore, applied mostly to the construction and improvement of levees in Dasha and Chicot Counties, Ark., as contemplated in the act of incorporation referred to.

Of the eighteen incorporated levee districts above enumerated, fifteen have at this date an outstanding bond issue amounting to $4,766,700.

3d. The Police Juries of the parishes in the alluvial parts of the State are also authorized and empowered, under certain circumstances and conditions, to levy taxes for levee purposes, and are, furthermore, charged by law with the duty of caring for, preserving and maintaining the levees, conjointly with the State and Levee Districts.

"(b) the returns that are received from such system of taxation, if possible for the last five years, giving simply the total amount each year."

Answer: Without a great deal of research into the past reports of the Auditor of Public Accounts and of the Treasurer of the State, it would not be possible to state in anything like exact terms "the returns received from such a system of taxation", as I think you will readily appreciate.

This information might, however, be obtained with much less labor and delay from those departments, on application.

I can, however, from the records of this department, furnish you with a statement showing, biennially, the amounts expended through this department for levee purposes in the State, paid out of funds derived from this system of taxation, for many years past, but will confine myself in this statement to the period to which you refer—"the last five years"—as follows:

	State Work. Cost.	District Work. Cost.
1900-1902	$332,118.53	$ 884,999.71
1902-1904	449,620.15	1,647,978.36
1904-1906	457,597.16	832,743.23
Totals	$1,239,335.84	$3,365,721.30
		1,239,335.84
Grand totals		$4,605,057.14

It should be noted that, in the foregoing amounts, the large sums annually required and expended for cost of collection, interest on bonds and notes, discounts, administration and other incidental expenses incurred by the Engineer Department and Boards of Levee Commissioners, are not included.

Again, in connection with this line of information, it may not be uninteresting to you to learn that, exclusive of the items of expense enumerated in the foregoing paragraph, the amount of money expended for levee purposes by the State of Louisiana and the several levee districts of the State, in the last forty years, exceeds $30,000,000.

"(c) The methods by which money is disbursed, whether by the State or levee district or by a commission or Board, or by a State or District Engineer."

Answer: The money accruing to the General Engineer Fund is expended upon levee work recommended for construction by the Board of State Engineers to the Governor of the State. Upon the receipt of such recommendations, the Governor advertises for proposals to construct, awarding contracts to the lowest responsible bidders, the work being carried on under the supervision and in accordance with the general conditions and specifications prescribed by the Board of State Engineers.

The money accruing to the Levee District Funds, as far as levee construction, improvement and maintenance is concerned, is also expended upon levee work recommended for construction by the Board of State Engineers, but, in this instance, the recommendation is to the Boards of Levee Commissioners instead of to the Governor of the State. Upon the receipt of recommendations from the Board of State Engineers, the Levee Districts, except in special cases of emergency, or of policy, also advertise for proposals to construct, awarding contracts to the lowest responsible bidder, the work being likewise carried on under the supervision and direction of the Board of State Engineers, assisted by Inspectors appointed by the Levee Districts.

In this connection it may be well to briefly explain the composition and functions of the Board of State Engineers. The Board consists of five engineers, a Chief State Engineer and four Assistant State Engineers—all Civil Engineers. The duties of the Board relating to levee construction are, as defined by law, in all but one levee district—the Orleans Levee District—to make surveys of water courses, public works and levees; to report to the Governor of the State the improvements necessary and the levees to be constructed;

to furnish estimates and specifications of the work required; to examine and measure the work when completed, and done under contracts made by the State and the Levee Districts, and to certify the amount of payments due for work thus executed. It is in general terms an advisory Board on all matters of public improvements undertaken by the State and Levee Districts, but more particularly so on matters relating to levee work. Its duties towards the Orleans Levee District are limited to the approval or disapproval of projects for building and repairing the levees in the district on the Mississippi River.

Under other laws the Board of State Engineers has other duties to perform, but these are not germane to this subject, and need not be described.

"(d) The object for which the money is expended, whether levee construction or levee repair or both, etc., by the levee district, by the State, and by the Federal Government."

Answer: The money is expended for both levee construction and repair, by the Levee Districts and by the State, as necessity and occasion may demand.

"(e) The extent to which the State or district co-operates with the Federal Government in planning its levee system and in the actual construction of the same."

Answer: Conferences, formal and informal, occur, from time to time, between the levee authorities of the State and those of the United States, with reference to projects and to details of construction, resulting in understandings in regard to the work to be undertaken by each, the United States authorities being at all times accorded the right of selection.

"(f) The total mileage of levees built by your district and the approximate cost per mile."

Answer: The total mileage of levees in this State, and in that part of Arkansas affecting this State, is, at this time, about as shown in the following table:

LENGTH OF LEVEE LINE IN LOUISIANA AND IN PART OF ARKAHSAS PROTECTING LOUISIANA. (1907).

NAME OF LEVEE DISTRICTS.	Miles on Mississippi River	Miles on Bayou Lafourche	Miles on Atchafalaya River	Miles on Red River	Miles on Other Streams	Total Miles by Districts
Tensas Basin					40.0(a)	40.00
Fifth Louisiana	237.3				39.0(b)	276.30
Atchafalaya Basin	128.1	75.0	41.9			245.00
Pontchartrain	125.6					125.60
Lafourche	119.4	74.1				193.50
Orleans	26.5				48.0(c)	74.50
Lake Borgne	48.0					48.00
Grand Prairie	30.4					30.40
Plaquemines Parish, East Bank					15.0(d)	15.00
Buras	33.7					33.70
Caddo				79.2	9.0(e)	88.20
Bossier				54.3		54.30
Red River, Atchafalaya and Bayou Boeuf			34.6	36.8(f)	48.0(g)	119.40
Red River and Bayou des Glaizes				19.9		19.90
Saline				7.6		7.60
North Bossier (h)						
Courtableau (i)						
Cat Island (j)	12.8					12.80
State of Arkansas, protecting Louisiana	71.8				28.0(k)	99.80
Outside of Levee Districts				31.8		31.80
Totals by streams	833.6	149.1	76.5	229.6	227.0	1515.80

(a) Includes 10.5 miles on Ouachita River, 17 miles on Black River, and 13 miles on Little River.
(b) Includes 12.7 miles on Black River, and 26.3 miles on Tensas River.
(c) Rear levees, etc.
(d) Along Gulf Coast, Parish of Plaquemines.
(e) All on Bayou Pierre.
(f) Includes 1.5 miles on Bayou Rapides.
(g) All on Bayou des Glaizes.
(h) Not in active operation.
(i) Not in active operation.
(j) Not in active operation.
(k) Includes 15 miles on Arkansas River below Red Fork and 13 miles on Amos Bayou and Cypress Bayou (cross line).

It is hardly possible to give the cost per mile for levee work. Local conditions and the character of work demanded vary too greatly in different parts of the State. However, the average cost per mile of

the levee work completed by the State and levee districts, during the past season of construction—1906-1907—was as follows: new embankments, about $17,000.00 per mile; enlargement, about $6,000.00 per mile.

"(g) Reference to general laws or regulations governing levees and Levee Districts."

Answer: The general laws and regulations governing levees in the State of Louisiana are numerous and sweeping.

The power of the State and of the Levee Districts is almost unlimited, in all matters relating to construction of, caring for, preserving, maintaining and policing the levees. Right of way for levee purposes (location, construction, maintenance, policing, etc.) in all but one Levee District—the Orleans Levee District—is exacted without compensation of any kind whatsoever to the owner of the property.

To cut a levee for any purpose whatsoever, except for its repair; to place pipes, or conduits, through or under it, except, under certain conditions, in cities; to obstruct it in any way with fences, buildings, or material of any kind; to ride or drive upon it, etc., etc., is prohibited, and violations punished by fine or imprisonment, or both.

I mail you with this a copy of the biennial report of the Board of State Engineers to His Excellency, Newton C. Blanchard, Governor of Louisiana, from April 20, 1904, to April 20, 1906. In this may be found many details relating to the laws governing in levee matters and the operations of the State and the Levee Districts. In the Appendices will also be found, among many other things, a list of the acts of the General Assembly of the State of Louisiana from 1876 to 1906, revised to date, and articles of the Constitution of the State, relative to levees, drainage, roads, etc., and the duties of the Board of State Engineers. Also a skeleton map, approximately corrected to date, showing the geographical position of the levee districts of Louisiana and a part of Arkansas, approximate location and lengths of levee lines in each, and other information of a statistical character.

In conclusion, I beg leave to assure you that I shall at any time be pleased to further assist you in collecting information on these lines for your department, when in my power to do so; and, if there be any part of the information and explanations, herein furnished you, that require elaboration, I shall be glad to do it, upon request.

Respectfully,

FRANK M. KERR,
Chief State Engineer.

P. S.—While the acts of incorporation of the various Levee Districts generally appear to limit the extent of the ad valorem tax to ten mills, Article 239 of the Constitution of the State, reads as follows:

"The General Assembly may divide the State into levee districts, and provide for the appointment or election of the levee commissioners in said districts, who shall in the method and manner to be provided by law have supervision of the erection, repair and maintenance of the levees in said districts; to that effect the Levee Commissioners may levy a tax not to exceed ten mills on the taxable property within the alluvial portions of said district subject to overflow; ***provided,*** that in case of necessity to raise additional funds for the purpose of constructing, preserving or repairing any levees protecting the lands of a district, the rate of taxation herein limited, may be increased, when the rate of such increase and the necessity and purpose for which it is intended shall have been submitted to a vote of the property taxpayers of such district, paying taxes for themselves or in any representative capacity, whether resident or non-resident, on property situated within the alluvial portoins of said district subject to overflow, and a majority of those in number and value, voting at such election, shall have voted therefor."

P. S. No. 2—All taxes levied for levee purposes are collected through the State Tax Collectors, and all amounts collected deposited in the State Treasury, subject to a certificate of payment or warrant from a member of the Board of State Engineers, for all amounts earned from the General Engineer Fund, and from the proper officer of Levee Districts for all amounts earned from district funds. The State Teasurer is also the custodian of all bonds subject to issue by the Levee Districts. F. M. KERR.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., May 1, 1908.

Honorable President and Members of the Petite Anse-Coteau Drainage District, New Iberia, La.

GENTLEMEN—We are in receipt of communications from the Engineer of the Petite Anse-Coteau Drainage District, Mr. Walter Y. Kemper, enclosing the following papers pertaining to the affairs of the district.

1st. Copy of the call for election.

2nd. Copy of the description of the boundaries of the district.

3rd. Copy of general description and specifications of the canals.

4th. Copy of resolution adopted by the Board of Commissioners assuming control of certain canals, coulees, drains, etc., at a meeting held in New Iberia, La., on April 7, 1906.

5th. A map of the district outlining the main drainage canals and the branches thereof.

The resolution passed by your Board at its meeting of April 7, 1906, a certified copy of which is one of the papers mentioned, enumerates the bayous, coulees, canals, sloughs, etc., which the Board has selected as the lines of drainage of said district, and requests the approval of the Board of State Engineers of these selections and any other selections which the Board might make of "public drainage channels" to be used for the improvement of the drainage of the district. These selected routes are distinctly outlined on the map of the district filed with this office.

We beg to state that, after having examined the map above referred to, in connection with the resolution, a copy of which has been filed with us, we find that the routes selected by your Board and enumerated and described in the above mentioned resolution, will improve in a great measure the drainage of the territory composing the Petite Anse-Coteau Drainage District, and therefore, under Section 1 of Act 61 of the General Assembly of 1904, we approve the selection of all the drainage routes selected and mentioned in the resolution of your Board passed on April 7, 1906, a copy of which resolution has been filed with us.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
ARSENE PERRILLIAT,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., Sept. 18, 1906.

Mr. W. Richards Gates, Secty. Yellow Bayou Drainage District, Franklin, La.

DEAR SIR—Your communication of July 23rd was duly received and thoroughly examined. It contained:

1st. "Map of the District showing route of proposed canal, together with property owners therein and boundaries of district."

2nd. "Copy of the call for election."

3rd. "Copy of description of the boundaries and general specifications of canal and district."

4th. "Resolution adopted by the Board of Commissioners assuming control of drains, etc., within the district, as well as the outlet to canal which is not in the district."

5th. "Copy of contract for the cleaning out of Yellow Bayou."

6th. "Copy of the contract for the digging of the canal from head of old canal to Yellow Bayou."

With regard to this communication I would like to make the following remarks; referring them to the enumeration of the above paragraphs:

1st. The Map of the District is rather incomplete, as it does not give the number and location of the townships, nor does it give a north and south line. Furthermore, the outlines of the proposed drainage canal, Yellow Bayou, the Culvert of the Southern Pacific Railroad, the St. Mary Dredging and Improvement Canal, and the other parts of the proposed drainage system described in the resolution passed by the Board, should be lettered on this map boldly, with large letters "A", "B", "C", "D", etc., so that in referring to the different parts of the canal for which approval is requested, reference might be made to the stretches "A to B", "B to C", "C to D", etc. I would suggest that the map be corrected in this respect.

3rd. "Copy of description of the boundaries and general specifications of canal and district." The description of the boundaries of the district, which I find in the proceedings of the Police Jury, seem to be rather vague when followed on the map. If this description of boundaries could be given more thoroughly as regards the names of the various properties on the map and the number of the various sections enumerated on the map, I think it would be better and avoid possible complications in the future, should any one desire to attack the organization of the drainage district in the courts. We have known two or three cases where the organization and drainage work of some drainage districts have been held up in the courts for a long while, owing to faulty boundary descriptions.

4th. "Resolution adopted by the Board of Commissioners assuming control, etc." With regard to this resolution we are prepared to give the approval requested by the drainage commission under Section 1 of Act 61 of 1904, provided the specific canals or bayous for which this approval is requested be mentioned, and also be specifically outlined on the map by name and by letters, as above suggested, so that we might readily identify them on the accompanying map.

At present, the resolution makes reference to certain canals, the St. Mary Dredging and Improvement Canal, for instance, but there is nothing on the map by which we can identify this, except some blue lines, and we do not feel that we can assume these blue lines to represent what is described in the resolution. Moreover, the resolution requests us to approve a canal which is not within the district, and under Section 1 of Act 61 it is specifically mentioned that this approval must be given for "public drainage channels *within* the limits of their respective districts."

Again, we are requested to approve the selection of "sloughs or coulees within the limits of the district, though they may not be connected with the above mentioned drainage arteries, but provided they be public drainage channels," etc. This is rather a sweeping request, and we do not feel that we can give such a sweeping approval, under the terms of the law.

We will gladly approve the selection of such channels as you have definitely selected or such "parts of or extentions to improved channels" which you may contemplate selecting as an extension to the approved system, but we do not feel that we can give an approval in blank to any and all selections until we have looked over them and satisfied ourselves that they are public drainage channels, as contemplated by Act No. 61. If the Board will modify the wording of its resolution in accordance with the above suggestions, we will gladly forward the approval requested.

We have made it a rule to look very thoroughly into all such drainage matters which are submitted to us, and we make to you the above suggestions so that in the future everything might be so plain that there will be no possible misunderstanding, and no reason for any of the taxpayers to find fault or take exception, and thereby delay the prosecution of the entire work.

Very respectfully yours,

ARSENE PERRILLIAT,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORRLEANS, LA., Dec. 27, 1906.

Mr. W. R. Gates, Secty. Yellow Bayou Drainage District, Franklin, La.

DEAR SIR—We are in receipt of a map and papers, the map outlining the limits of the Yellow Bayou Drainage District, and the public drains now existing and in contemplation within the limits of said district, and the papers consisting of:

1st. "Copy of the call for election," within said District.

2nd. "Copy of the description of the boundaries and general specifications of canal and district."

3rd. "Resolution adopted by the Board of Commissioners assuming control of drains within the district."

4th. Copy of the contract entered into between Messrs. Harris and Henderson and the Yellow Bayou Drainage District for the purpose of digging out, cleaning and deepening certain canals.

All of these papers accompanied by a letter from you dated December 25, 1906.

I beg to state that we have examined the resolution of your Board, passed on December 15, 1906, duly certified to by the Secretary of the Board, and have followed the line of canals and drains mentioned in said resolution and outlined on the accompanying map by letters "H", "F", "E", "D", "C", "B", "A", which mark the course of Yellow Bayou, and the letters "G", "F", which mark a branch of said Yellow Bayou.

We desire to state that the selection of this drainage route meets with the approval of our Board, and that, under the terms of Section 3, Act 61 of 1904, we hereby approve such a selection.

Very respectfully,
THE BOARD OF STATE ENGINEERS.
Per ARSENE PERRILLIAT.
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., March 2, 1907.

To the President and Board of Commissioners, of the White and Cypress Bayou Drainage District, East Baton Rouge Parish, Zachary, La.

GENTLEMEN—At your request, I have made a survey, on the route selected by you, for improving drainage in your district. Owing to the high stage of water my services have been urgently needed on the levees of the levee districts of which I have charge, hence the delay in submitting the report.

The survey is on the route indicated on the map herewith transmitted. I also transmit, herewith, a profile of the line surveyed, both in detail and condensed form; also a general map of your drainage district, showing the canals in profile and cross section, making in all four exhibits of the work.

Taking into consideration the small amount of money that your district will be able to raise by a 10-cent per acre tax, the route surveyed is as good as could be selected.

The length of the line surveyed is approximately 7.5 miles. The work could properly be divided into three classes, as follows: canal through timber, the cutting off of certain bends and clearing of timber in the channel of Cypress Bayou, and that portion of the canal through cleared fields. It will not be possible, in view of your probable resources, to consider a canal of greater size than 20 feet bottom width, with side slopes of 1 to 1 on each side, the earth to be excavated from this canal to be placed all on one side, leaving a berme of 20 feet between the edge of the canal and the spoil bank. The estimated contents of such a canal, excavated to the grade shown on the profile submitted, are 163,000 cubic yards.

The survey made is sufficient to advertise the work and enable contractors to submit proposals for the construction of the canal. I enclose you a form for advertising work of this character, and also specifications prescribed by the Board of State Engineers for drainage work. Should your Board decide that it is within its means to undertake the work, it could be advertised at once.

As to the manner of doing the work—whether by dredge scrapers, or wheelbarrows—this should be left to the proposals submitted in answer to your advertisement.

Some items of expense were incurred by Mr. Fulton, the leveler of this Board, for transportation, labor, etc., in connection with the drainage survey of your Board, which of course will have to be met by you. I enclose, herewith, a bill for same.

Respectfully submitted,

M. P. ROBERTSON,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE STATE BOARD OF ENGINEERS,
NEW ORLEANS, LA., Nov. 8, 1907.

Hon. N. P. Phillips, President, and Members Board of Commissioners, Second Drainage District of Pointe Coupee Parish, Torras, La.

GENTLEMEN—The Board of State Engineers begs to submit the following report on the drainage of the district which you represent. This report is accompanied by four maps, one large blue print representing the entire district on the scale of 1 mile equals 2 inches, and three small blue prints marked Sheets Nos. 1, 2 and 3, respectively, on the scale of 1:12,000, which give the details of the lines followed and the cross section of the country at frequent intervals, and a profile of the line recommended in this report. The elevations are all referred to Cairo Datum.

The line recommended begins near Barbre's Landing, at the head of Bayou Moreau (marked "F"), and follows Bayou Moreau to its intersection with the Simms Canal, then the Simms Canal is followed to its intersection with Marine Bayou and Fishers' Bayou (marked "E"), then Marine Bayou is followed to its intersection with Horse Bayou, and Horse Bayou is followed until it loses itself in the low swamp, the axis of the low swamp is then followed passing through bottoms called "The Bays", and also through what is known as Hog Lake, until the east prong of Lake Bayou is reached (at the point marked "D"), the east prong of Lake Bayou is followed to its intersection with Castle Bayou, then Castle Bayou is followed to the axis of the low swamp near its intersection with Garwood Bayou, the low swamp is then followed to Morris Bayou, Garwood Bayou to its intersection with Bayou Latanche (at the point marked "C"), from there the line follows Little Flat Bayou until it empties into Flat Bayou, and Flat Bayou until it intersects

Cowhead Bayou (at the point marked "B"), then the axis of the low swamp is followed to the point where it intersects Johnson Bayou, and Johnson Bayou is followed to the point "A" on the map, where no further excavation is necessary. This line is marked on the large blue print by a red dotted line. It will be the main artery of drainage of the district, and into it will fall the various laterals.

Fishers' Bayou is used as one of the laterals from the point "E", where it intersects Simms Canal, to the point "G", where it intersects Bayou Lettsworth.

Other laterals will be Cowhead Bayou and either Black Bayou or White Vine Bayou. Surveys for these two laterals are now being made and will form the subject of a supplemental report.

The grade of the bottom of the excavation at the upper end of Bayou Moreau will be 53.00 Cairo Datum, and the grade of the bottom at the lower end of the system (marked point "A") will be 36.00 Cairo Datum, making a fall of 17 feet in 33.7 miles, or a slope of one-half foot to the mile, which is considered a good slope for drainage purposes.

The width of bottom recommended varies. From the lower end, point "A", to the mouth of Cowhead Bayou, point "B", width of bottom 60 feet; from point "B" to the mouth of Bayou Latanche, point "C", width of bottom 50 feet; from point "C" to the mouth of Coyle Bayou, point "D", width of bottom 40 feet; from point "D" to the mouth of Fishers' Bayou, point "E", width of bottom 30 feet; from point "E" to the upper end of Bayou Moreau, point "F", bottom width 20 feet. From point "E" also, to the upper end of Fishers' Bayou lateral, point "G", width of bottom 20 feet. The side slope recommended for all of this excavation is 1 vertical to 1½ horizontal.

Based upon the above sections, and calculated from many cross sections taken along the line of the survey, the contents of the necessary excavation from the upper end of Bayou Moreau (point "F") to the lower end of Johnson Bayou (point "A") are estimated at approximately 1,370,000 cubic yards; and the Fishers' Bayou lateral, from point "E" to point "G", is estimated at approximately 140,000 cubic yards, making an estimated total of 1,510,000 cubic yards for the lines reported upon.

It is possible that this amount may be slightly reduced when the working surveys are made, by finding some lower points where the drainage line follows the axis of the low swamp, or by making some cut-offs where the bayous followed make some marked curves. We

have found, however, generally speaking, that it requires much less excavation to follow the sinuosities of bayous than to attempt to cut across country, even if the line is thereby shortened.

The Cowhead Bayou and the White Vine or Black Bayou laterals are still under consideration, but basing an estimate of the excavation required for them upon the excavation required from the above reported surveys, we think that these other feeders should add some 700,000 additional cubic yards to the project.

It might perhaps be possible to reduce the section of the proposed drainage routes, and perhaps raise the grade and flatten the slope of the bottom, but this would not meet with our recommendation, as it would render the drainage less efficient than we think it is your desire it should be.

It would appear that the cutting out of low places between points "A" and "C"", at the lower end of the district, would give immediate relief to a large area, and that the cutting out of a channel between the point "D" and the intersection of Bayou Moreau and Simms Canal would also give immediate relief to a large area in the upper end of the district.

The accompanying sheets give the length of the various stretches and the character of the ground and timber in the locality, and will be of value in placing the work under contract.

Very respectfully,

THE BOARD OF STATE ENGINEERS,

Per ARSENE PERRILLIAT,
Asst. State Engineer.

STATE OF LOUISIANA,
OFFICE STATE BOARD OF ENGINEERS,
NEW ORLEANS, LA., Jan. 2, 1908.

Hon. N. P. Phillips, President, and Members of the Board of Commissioners, Second Drainage District of the Parish of Pointe Coupee, New Orleans, La.

GENTLEMEN—Since our report of November 8, 1907, to your Honorable Board, we have completed additional surveys and examinations of Cowhead and Black Bayous, and we desire to submit the following report to you:

We enclose three maps: Map No. 1, on a scale of 1 mile: 2

inches, is the same as the original map of your entire district, with the additional surveys of Cowhead and Black Bayous outlined thereon; Sheet No. 4, on a scale of 1:12,000, gives the details of the lines followed along Cowhead and Black Bayous; the third sheet, which is a profile, gives the profile elevations of Cowhead and Black Bayous.

The lines which we recommend to drain the eastern and southeastern half of your district, begin on the map at the point "B", and follow Cowhead Bayou until a short distance after it crosses the Texas and Pacific Railway embankment in the rear of New Texas, a total length of about 71,100 feet, or 13.46 miles. This Bayou is indicated by the letters "B", "H", "I" and "J". It is a well marked and defined bayou, which only requires some cleaning and dredging to make it a thoroughly efficient drain.

At the point "H", about 38,500 feet distant from the mouth of Cowhead Bayou indicated on the map by the letter "B", the survey follows Black Bayou for a distance of 30,700 feet to the point "K".

The clearing of these two drains will tap the southeastern and eastern sections of your district, and will give great relief to that part of the country. Cowhead Bayou may be considered a lateral drain to the general system recommended in our report of November 8, 1907, and Black Bayou may be considered a lateral to Cowhead Bayou.

The grade of the bottom generally has a slope of one-half foot to the mile, except the Black Bayou lateral, which has a slope of about one foot to the mile in order ot avoid too dep a cut.

We recommend that Cowhead Bayou, from the point "B" to the point "H", about 38,500 feet in length, be given a forty (40) feet bottom width, and side slopes of 1½ horizontal to 1 vertical; from the point "H" to the point "I", a distance of about 9,700 feet, that the bottom be 30 feet wide, and side slopes of 1½ horizontal to 1 vertical; that from the point "I" to the point "J", a distance of 22,900 feet, it be given a bottom width of 20 feet, with side slopes of 1½ horizontal to 1 vertical. We recommend that Black Bayou, from the point "H" to the point "K", a distance of 30,700 feet, be given a bottom width of 20 feet, and side slopes of 1½ horizontal to 1 vertical.

Based upon the above sections, and calculated on the same basis as the calculations submitted to you on November 8, 1907, the excavation necessary in Cowhead Bayou from "B" to "J", would amount to 161,614 cubic yards; and the excavation necessary in Black

Bayou, from "I" to "K" would amount to approximately 139,406 cubic yards, making a total of 301,110 cubic yards for the two laterals now reported upon. This reduces the estimate for the same bayous made in our report of November 8, 1907. It is also possible that these estimates may be reduced by more detailed surveys which will necessarily be made ahead of the dredge.

The accompanying description of the character of the bayous and of their banks wi be of value in inviting bids from contractors.

Very respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per ARSENE PERRILLIAT,
Asst. State Engineer.

APPENDIX C.

STATEMENTS RELATIVE TO HIGH WATER RECORDS.

D YEARS INDICATE

1897		1
17.10	Apl. 6	14.70
27.80	Apl. 17	21.50
30.95	May 2	27.20
28.90	Feb. 24	28.50
61.10	Feb. 26	61.40
35.30	Feb. 28	36.20
51.67	Mch. 25,26	49.78
49.25	Mch. 20	38.80
37.90	Mch. 15	24.60
37.66	Mch. 20	37.59
51.75	Apl. 4	49.11
52.42	Mch. 29	51.05
17.00	Mch. 20	**35.00**
23.20	Mch. 21	20.30
51.90	Mch. 20	51.13
46.75	Mch. 29	46.16
44.54	Mch. 30	44.35
52.48	Apl. 16	49.40
49.82	May 2	47.40
28.60	Mch. 23	27.90
24.10	Apl. 11, 13	15.00
26.25	Apl. 14, 15	17.40
50.95	May 13, 14	42.35
36.10	May 15	33.90
50.20	May 14, 15	44.30
40 65	May 13, 15	34.60
36.25	May 13, 17	30.57
32.75	May 13	27.95
27.95	May 15	23.50
19.17	May 13	16.90
19.50	May 13	.....
	Apl. 22, 23	
7.20	May 14, 16	6.70

data on file in the office

ASTOR, LENOX AND
TILDEN FOUNDATIONS.

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REPORT

—OF THE—

BOARD OF STATE ENGINEERS

—OF THE—

STATE OF LOUISIANA

—TO—

HIS EXCELLENCY, JARED Y. SANDERS

GOVERNOR OF LOUISIANA

FROM

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REPORT

OF THE

Board of State Engineers.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 20, 1910.

To His Excellency, Jared Y. Sanders, Governor of Louisiana:

SIR—The Board of State Engineers has the honor to submit, for your Excellency's information, the following report, with accompanying appendices, covering the period from April 20, 1908, to April 20, 1910:

DUTIES AND PERSONNEL OF THE BOARD.

The Board of State Engineers was created by Act 33, approved February 10, 1879. The duties of the Board, as defined by this Act, are to make surveys of water courses, public works and levees of the State; to "report to the Governor of the State the improvements necessary and levees to be constructed, which are of prime importance to the State at large"; to furnish estimates and specifications of the work so required; to examine and measure the work recommended by the Board, and done under contracts made by the State, and to certify the amount of payments due for work thus executed.

Under the provisions of later laws, the Board has been constituted, in general terms, the engineers and advisers of the following named Boards of Levee Commissioners so far organized in the State, viz.:

1. The Fifth Louisiana Levee District, by Act 44 of 1886.
2. The Tensas Basin Levee District, by Act 59 of 1886.
3. The Red River, Atchafalaya and Bayou Bœuf Levee District, by Act 79 of 1890.
4. The Pontchartrain Levee District, by Act 95 of 1890.
5. The Atchafalaya Basin Levee District, by Act 97 of 1890.
6. The Lafourche Basin Levee District, by Act 13 of 1892.

7. The Lake Borgne Basin Levee District, by Act 14 of 1892.
8. The Caddo Levee District, by Act 74 of 1892.
9. The Bossier Levee District, by Act 89 of 1892.
10. The Buras Levee District, by Act 18 of 1894.
11. The Cat Island Levee District, by Act 110 of 1894.
12. The Grand Prairie Levee District, by Act 24 of 1898.
13. The Plaquemines Parish East Bank Levee District, by Act 7 of 1902.
14. The Red River and Bayou des Glaizes Levee and Drainage District, by Act 107 of 1904.
15. The Saline Levee and Drainage District, by Act 80 of 1906.
16. The North Bossier Levee District, by Act 138 of 1906.
17. The Orleans Levee District. In the case of this District, created by Act 93 of 1890, the only reference to the Board of State Engineers is as follows:

"Section 6. Be it enacted, etc., That the said Board of Levee Commissioners, as to location, construction and repairs of all levees necessary to protect said district, shall first have the approval in writing of the State Board of Engineers."

Later on, by Acts 79 of 1892, and 140 of 1900, the Board of Commissioners of the Orleans Levee District was required to have the approval in writing of the Board of State Engineers, as to location, construction and repairs of levees "on the river front of said District," only.

As will be noted, the Courtableau Levee District does not appear in the list of Levee Districts given at this date, Act 166 of 1902, by which it was created, having been repealed by Act 252 of 1908. However, by Act 253 of 1908, the territory embraced within the boundaries of the Courtableau Levee District, as defined by Act 166 of 1902, was, with certain other territory, added to the Atchafalaya Basin Levee District.

Act 253 of 1908 describes this addition to the Atchafalaya Basin Levee District as follows, viz.: "A strip of land in St. Landry Parish, lying between Bayou Courtableau on the northeast, and the Atchafalaya River on the east, the parish line of St. Martin, on the south, and Bayou Teche on the west, shall be embraced in the limits of a Levee District to be known and styled 'The Atchafalaya Basin Levee District,' and all lands and other property of every description whatsoever upon said lands shall be subject to taxation, legal assessment and forced contribution for the purpose

of raising funds to construct and maintain levees in the said District and to protect the land thereof from overflow."

In addition to the foregoing, the following list of general laws, specially calling for, or imposing other duties upon, either the Board of State Engineers as a whole, or the Chief State Engineer, will be found, viz.:

Relative to the New Basin Canal and Shell Road: Act 144 of 1888. "Section 26. Be it further enacted, etc., That for any repairs and improvements to be made on said New Basin Canal, the Governor shall, upon the application of said Board of Control, direct the Board of State Engineers to furnish such lines and levels, plans and estimates as may be considered necessary for the proper and efficient execution of the work, and the said Board of Engineers shall make such reports, from time to time to the Governor, as will show the condition and progress of such improvements and repairs."

Relative to Steam Railroads Operating on the Public Levees: Article 239, Constitution of 1898. "The Boards of Levee Commissioners of the several levee districts, when authorized so to do by the Board of State Engineers, shall have full power and authority to contract with and permit any steam railroad corporation to construct, maintain, freely use and operate on the public levees, a railroad track or tracks; the supervision, control and general police power over such levees, however, to remain in and with the several Levee Boards."

Relative to Road Districts: Article 294, Constitution of 1898. "The State Board of Engineers, whenever called on so to do, shall furnish the different road districts with plans and specifications for public roads, and such assistance and advice as will tend to create a uniform system of public roads throughout the State."

Relative to Drainage Districts: Act 61 of 1904, Section 1: "Be it enacted by the General Assembly of the State of Louisiana, That the various Levee and Drainage Districts of this State shall have control over all public drainage channels within the limits of their respective districts and for a space of one hundred feet on each side thereof, selected by the district and recommended and approved by the Board of State Engineers, whether such drainage channels have been improved by the Levee or Drainage District, or have been adopted without improvement as necessary parts of

or extensions to improved drainage channels; and shall have authority to adopt rules and regulations for preserving the efficiency of said drainage channel."

Act 103 of 1906, Section 1: "Be it enacted by the General Assembly of the State of Louisiana, That, in addition to the duties already prescribed by law, it shall be the duty of the Board of State Engineers to make such preliminary surveys and other surveys and to perform such services as may be required by the Board of Commissioners of any drainage district in the State of Louisiana, for the construction of ditches or canals, or other public works necessary for drainage purposes in any drainage district in this State."

The Act further provides that any and all expenses incurred by the Board of State Engineers in the performance of such services shall be paid in cash by the drainage districts requiring them.

Relative to the Natural Gas Fields of the State: Act 71 of 1906, Section 2: "That whenever such owner or proprietor or person in possession of such wild, or uncontrollable, wasteful or wastefully burning natural gas well, shall be notified to close, cap or plug same, or otherwise prevent the escape and waste or wasteful burning of natural gas therefrom, he shall in good faith commence the work of so closing or capping or plugging the same, in order to prevent the escape and waste or wasteful burning of natural gas therefrom, within five (5) days from the receipt of such notice, the Governor, on written complaint of any person, firm or corporation, having an interest in the stopping, plugging or closing of such natural gas well, shall direct the Board of State Engineers to take charge of the work of closing such wild or uncontrollable or wastefully burning natural gas well, and the Board of State Engineers shall then proceed at once to cap, or close or plug the same, or otherwise prevent the wasteful escape or wasteful burning of natural gas from such well, at the expense of the owner or proprietor thereof," etc.

Act 137 of 1908: "Section 1. Be it enacted by the General Assembly of the State of Louisiana: That it is hereby made the duty of the Chief Engineer of the Board of State Engineers to forthwith run and fix the water boundary between the States of Louisiana and Mississippi, from the mouth of Pearl River to the

Gulf of Mexico, as fixed by the decree of the Supreme Court of the United States in the suit of Louisiana versus Mississippi, and mark any buoy the same in such manner as to be reasonably permanent and so as to make the location of the line reasonably plain and apparent to those navigating these waters."

Act 144 of 1908: "Section 1. Be it enacted by the General Assembly of the State of Louisiana: That a Board of Commissioners, to be known as the 'Commission on Natural Resources,' is hereby created, to be composed of seven members, two of whom shall be *exofficio* the Professor of Horticulture of the State University and the Chief Engineer of the State Board of Engineers," etc.

Act 262 of 1908, relative to the sale of certain lands under the waters of Lake Pontchartrain: "Section 2. Be it further enacted, etc., That the sale shall be made under the following terms and conditions:

"*First*—That the area included in this sale shall, within three months from the date of the promulgation of this Act, be determined by a survey approved by the Board of State Engineers, and within thirty days from the date of such approval, the said company or its successors or assigns, shall pay into the State Treasury the sum of one dollar and fifty cents per acre for all land included within such area," etc.

At one time or another, during the past two years, the Board of State Engineers has been called upon to render service under each and all of the foregoing Acts, requiring, from its members, in addition to actual field work, a great number of tours of inspection, and the submission of numerous reports and much correspondence, containing information and advice.

Though not specifically referred to in the Acts of the General Assembly of the State, governing the operations of the Atchafalaya Basin and Lafourche Levee Boards, in the matter of constructing a lock in Bayou Lafourche, near its head at Donaldsonville, and in improving said stream, in the interest of navigation and fresh water, the Board of State Engineers has continued, as called upon by the joint organization, composed of the members of those two Boards, provided for under Act No. 9 of 1900, to make numerous inspections, surveys, etc., with plans and specifications necessary for the advancement of the various steps involved in the prosecu-

tion of the project. The improvement of Bayou Lafourche is treated further on in this Report as a special subject, under the head, "Bayou Lafourche."

It will thus be seen that with each recurring session of the General Assembly of the State, the field of operations of the Board of State Engineers is materially enlarged, and the duties imposed upon its members and corps of employees greatly increased.

In addition to the general administration of the affairs of the Department thus outlined, as specified by law and passed into practice by precedent, the Board of State Engineers has, during this period, been called into service on a number of occasions in the matter of information, advice and direction by your Excellency, notably in furtherance of the Good Roads movement; by the United States, many of the Police Juries of the State, and other public bodies, involving, in a number of instances, extended inspections, surveys and other engineering work.

In this way, the constant care and attention of the members of the Board of State Engineers has been necessary during the entire time covered by this Report, and, in addition to the office force proper, has required the regular employment of four instrument men, and, from time to time, of as many rodmen, as assistants in the field. On occasions, too, the employment of men in other capacities, both in the field and in the office, was demanded.

In this connection it should be recorded that the Board of State Engineers was re-organized September 14, 1908, the following members of the preceding Board retiring, to-wit: Messrs. Sidney F. Lewis, Arsene Perilliat and Marshall P. Robertson. These were, by appointment, succeeded by Messrs. Walter H. Hoffman, Joseph W. Monget and Hugh C. Smith, Messrs. Frank M. Kerr and Gervais Lombard being re-appointed.

With direct reference to the members of the Board of State Engineers, as now constituted, their attention has, as heretofore, been directed to the affairs of all of the districts, and to duties in any one of them, as occasion demanded. As a matter of system and convenience, however, the engineering work in the levee districts generally has received the especial attention of and been directed by them about as follows, viz.: In the Tensas Basin Levee District and the Fifth Louisiana Levee District, by Assistant State Engineer Walter H. Hoffman; in the Atchafalaya Basin,

Lafourche and Buras Levee Districts, by Assistant State Engineer Hugh C. Smith; in the Pontchartrain, Lake Borgne, Grand Prairie and Plaquemines Parish East Bank Levee Districts, by Assistant State Engineer Joseph W. Monget; in the Caddo, North Bossier, Bossier, Red River Atchafalaya and Bayou Bœuf, Red River and Bayou des Glaizes, and Saline Levee Districts, by Assistant State Engineer Gervais Lombard; and in the Orleans Levee District, together with general supervision over and direction of affairs in all districts, by Chief State Engineer Frank M. Kerr.

Levee Work of the Past Two Years.

The contracts and agreements for levee work, undertaken during the past two years, by the State of Louisiana and the several levee districts of the State, with 45 contracts entered into previous to April 20, 1908, and still in force on that date, numbered 238, involving the handling of 19,875,733 cubic yards of earthwork, estimated to cost $4,722,001.49.

The amount and cost of levee work actually performed under these contracts (not taking into consideration percentages retained until completion) between April 20, 1908, and April 20, 1910, by the State of Louisiana and the levee districts of the State, with that done by the United States, is shown in the following table:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the Levee Districts	64.25	57.36	9,217,868	$2,430,077.90
By the State of Louisiana	29.78	28.30	3,350,111	699,701.55
By the United States	14.87	44.54	4,207,722	1,003,982.51
Aggregates	108.90	130.20	16,775,701	$4,133,761.96

The foregoing, divided as to territory, is as follows:

LOCALITY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
IN ARKANSAS:				
On the Arkansas River	3.28		102,663	$ 28,329.16
On the Mississippi River	1.59	21.01	1,410,641	351,508.97
IN LOUISIANA				
On the Mississippi River	50.36	83.38	10,837,867	2,946,059.53
On the Red River	37.50	13.66	2,883,872	455,498.78
On the Atchafalaya River	6.07	12.15	1,126,712	258,792.86
On the Ouachita River	0.06		5,218	824.00
On the Boeuf River	0.04		5,800	1,276.00
On the Gulf Coast	7.25		283,243	37,361.80
Interior Streams	2.75		119,685	54,110.86
Aggregates	108.90	130.20	16,775,701	$4,133,761.96

The amounts given in the foregoing tables do not include those involved in the drainage work executed by the Red River, Atchafalaya and Bayou Bœuf Levee District, during the past two years, costing $85,822.16, on which class of work some $5,643.00 worth still remains to be done under existing contracts. Nor do they include the work for the improvement of Bayou Lafourche, for navigation and the supply of fresh water, undertaken by the Joint Organization of the Atchafalaya Basin and Lafourche Levee Districts, on which some $417,548.48 has been expended from inception to date.

In addition to the above, there still remains to be done under contracts of the State and the several levee districts, in force at this time, an amount of levee work estimated to aggregate not less than 2,250,985 cubic yards, and to cost (in addition to percentages retained until completion) not less than $565,495.78. (See Appendix A for detailed statement.)

Again, a considerable amount of work has, as usual, also been done in, and expenditures incurred by the several levee districts

of the State and by the United States for weed-cutting, minor repairs, wooden revetments and for auxiliary works of various descriptions. Information upon which to base exact statements in regard to all these particulars is not at hand, but the sum involved is considerable.

Details relative to the location, character, extent and cost of the levee work of the past two years will be found in the paragraphs of this Report appearing under the head of "The Levee Districts," and in tabular form in Appendix A.

The Levee System.

The principal lines of continuous levee at present protecting the alluvial lands of Louisiana against overflow are as follows:

1. From the highlands near Pine Bluff, Ark., down the right bank of the Arkansas River, to within about five miles of the mouth of the old Arkansas River, a distance of about 87 miles, extending through the Linwood-Auburn Levee District of Jefferson County, the Linwood-Auburn Levee District of Lincoln County, the Red Fork Levee District, and that part of the Desha Levee District above Arkansas City, some 71.4 miles of which is leveed continuously. At the lower end of this continuous line, an extension, some 2.6 miles in length, is under contract by the United States Government, running along Dry Bayou towards the main line of the levees constituting the head of the Mississippi River levees. This extension, when completed, will reduce the gap between the Mississippi and Arkansas River levee systems to about 3.5 mile. At this date, this extension is still incomplete.

2. From Costello's Gin, a point on Amos Bayou, about five miles south of Red Fork and about twelve miles west of the mouth of the Arkansas, a continuous line of levee extends down the left bank of Amos Bayou about five miles; thence—crossing Boggy Bayou—to the right bank of Cypress Creek, about 1.5 miles; thence about six miles down the right bank of Cypress Creek to Lucca Landing, on the Mississippi River, where it joins the levee system on the right bank of the Mississippi River; and thence continuous down through Desha and Chicot Counties, Arkansas, and the Fifth Louisiana Levee District to Point Breeze, Concordia Parish, Louisiana, about 311.3 miles below, by the present levee line, thus making one unbroken line of levee from Costello's Gin, Arkansas, to Point Breeze, Louisiana, about 323.8 miles in length.

Previous to this year a gap in the public levee line, known as Bougere Crevasse, about 14.5 miles above Point Breeze, had existed since 1866. However, this year, a line of levee, 7.33 miles in length, aggregating 1,987,293 cubic yards in contents, and costing $626,887.54, which will effectually close this gap, has, with the exception of a short stretch of the line, not exceeding 100 feet in length, been completed by the United States. This short stretch of line in the new levee at Bougere, not yet completed, results from the continued sloughing of the embankment at that point, which, it is believed, it may be as well to leave untreated until after the high water of this year, and the return of local conditions more favorable for performing the necessary work, and for assuring success.

In the meantime, the embankment of the Texas and Pacific Railway Company across Bougere Swamp, which has served in lieu of a public line of levee during the last two periods of high water in the Mississippi River, remains intact, and presents every appearance of assuring equal protection for this year, under similar conditions.

3. From Torras Landing, at the mouth of Red River, (or, more properly, the mouth of Old River), the levee extends down the right bank of the Mississippi River, without break or interruption, to the outlet known as The Jump—that is, to within about 10 miles of the Head of the Passes, a length of 284.3 miles.

And from the same point at Torras Landing, the levee line runs along the south bank of Old River 7.0 miles to Barbres Landing; and thence down the left bank of the Atchafalaya River, to a point below Sherman's Bayou, or about 43 miles, a length of about 50 miles. These lines thus form a continuous system on the Atchafalaya, Old and Mississippi Rivers, 334.3 miles in length.

4. On the left bank of the Mississippi River the levee line extends uninterruptedly from Baton Rouge to what is known as the Lucas Canal, bout 6.0 miles below Fort St. Philip, a length of about 216.3 miles.

Up to last year, the outlet through the left or east bank of the river, known as Baptiste Collette Gap, located about three miles below Fort St. Philip, remained open.

However, upon the strong representations of parties in interest, that the overflow through this gap or outlet was, even at normal stages of the river, causing serious and extended damage to considerable areas of land, and to certain important and valuable

interests, particularly the oyster interests, a contract was let out in October, 1906, for its closure, provision therefor having been made jointly by the State, the Grand Prairie Levee District and the Oyster Commission of Louisiana. Owing to a number of unforeseen and unavoidable adverse circumstances and conditions, however, this work was not completed until May, 1909. The line of levee thus built, including the dam proper across the outlet, and the wings along the upper and lower side of the outlet, is 6,451 feet in length, or 1.2 miles, thus forming a detached local stretch of levee (in the Grand Prairie Levee District) of that length, in addition to the continuous line in the district of 30.1 miles.

5. The upper levee system of the Caddo Levee District, on the right or west bank of Red River, extends from Blanton Bluff, Ark., about 1.5 miles above the Louisiana line to Twelve-Mile Bayou, a length of line of about 51.4 miles.

6. The lower levee system of the Caddo Levee District—also on the right or west bank of Red River—extends from the bluffs, on the north side of Bayou Pierre, to near the lower limits of Caddo Parish, a length of line of about 34.8 miles. This is somewhat less than last reported, by reason of the fact that a short breach in the line, at a point on the Beaird and Bonner Place, very near its lower terminus, caused by caving banks, occurrerd in 1908, which has not yet been rebuilt.

7. The levees of the Bossier Levee District, on the left bank of Red River, extend from Hurricane Bluff to the Old Dennison Plantation, a length of about 49.0 miles.

Below this, the natural banks of Red River, in Bossier Parish, are, except at Ninock and Swift Chute Bayous, generally high enough, as compared with the high water of the past, to restrain all but very extreme floods, occurring, in the light of history, at long intervals of time. Both of these streams are now closed by levees.

8. The upper levee system of the Red River, Atchafalaya and Bayou Boeuf Levee District is continuous from the highlands on Bayou Rapides—about 1.5 miles above the mouth of the bayou—down the bayou to its junction with Red River, at Alexandria, about 1.5 miles; thence down Red River to the Avoyelles Prairies at David's Ferry, 35.3 miles in length, or a total for the upper system of 36.8 miles.

9. The lower levee system of the Red River, Atchafalaya and Bayou Boeuf Levee District is continuous on the right bank of

Bayou des Glaizes, from "The Junction," about 9.0 miles above Moreauville, down the bayou to its junction with the Atchafalaya River, at Simmsport, about 48 miles; and thence down the Atchafalaya River to Bayou Latanier, or Krotz Spring, about 11.5 miles below Melville, a length of about 37.0 miles, making a total of 85.0 miles for the lower system, and an aggregate of 121.8 miles for the entire district.

10. The levee system of the Red River and Bayou des Glaizes Levee and Drainage District, contemplated under the act of incorporation of the district, will involve the construction of lines of levee on Red River, the Atchafalaya River and on Bayou des Glaizes, aggregating probably 125.0 miles in length. Active levee building in the district, on the lines proposed, began in the early part of 1905, resulting in the completion to date of about 23.0 miles of work extending from David's Ferry to a point about one and a quarter miles below Bayou Natchitoches.

11. The levee system of the Saline Levee and Drainage District, organized under authority of law in 1906, contemplated, under the act of incorporation of the district, will involve about 17.5 miles of levee on the left or east bank of Red River, in Avoyelles parish, extending from near Cassandria to Saline Bayou. Active levee building in the district began in the early part of 1907, resulting in the completion up to this time of about 10.3 miles of continuous work, extending from Cassandria to and across Coco Point.

12. The levee system of the Plaquemines Parish East Bank Levee District, is intended to exclude the overflow waters of the Gulf of Mexico from that portion of the Parish of Plaquemines included in the Lake Borgne Basin and Grand Prairie Levee Districts, extending from the upper line of Harlem Plantation to the upper bank of Cuselich Canal, on the property of Peter Cuselich, below Old Quarantine Station, and, when completed, will be some 33.0 miles in length. Of this length of line, about 26.2 miles, including four cross levees, have so far been built, extending from Harlem Plantation to Harris Canal.

However, it must, unfortunately, be recorded that during the severe storm of September, 1909, a number of breaches occurred in the line then built, the Gulf level overtopping the levee, for a great part of its length. Much of the line, in addition, also sustained serious injury and loss of section, to restore all of which will require considerable yardage, and expenditure of money, provision for which, it is hoped, will be made during this year.

The aggregate length of levee lines thus described is 1263.5 miles. In addition to these, there are a number of lengths of levee line in comparatively isolated localities, and on interior streams, some parts of which are not located in any regular levee district, amounting to about 340.4 miles, making a total length of levee lines more or less protecting Louisiana, at this time, of 1603.9 miles; that is, 155.7 miles in the State of Arkansas and 1448.2 miles in Louisiana, divided, according to territory and streams, as follows:

REVISED LENGTHS OF LEVEE LINES IN LOUISIANA AND THAT PART OF ARKANSAS AIDING IN THE PROTECTION OF LOUISIANA (April 20, 1910).

Name of State Levee Districts.	Miles on Mississippi River	Miles on Red River	Miles on Atchafalaya River	Miles on Bayou Lafourche	Miles on Other Streams	Total Miles by Districts
Tensas Basin					(a) 40.0	40.0
Fifth Louisiana	239.5				(b) 39.0	278.5
Atchafalaya Basin	123.8		42.6	(c) 75.0		241.4
Pontchartrain	(d) 126.1					126.1
Lafourche	119.8			(e) 74.1		193.9
Orleans	25.9				(f) 48.0	73.9
Lake Borne Basin	47.9					47.9
Grand Prairie	30.1					30.1
Plaquemine Parish, East Bank					(g) 26.2	26.2
Buras	34.1					34.1
Caddo		86.2			(h) 9.0	95.2
Bossier		49.0				49.0
Red River, Atchafalaya and Bayou Boeuf		(i) 36.8	36.8		(j) 48.0	121.6
Red River and Bayou des Glaizes		23.0				23.0
Saline		10.3				10.3
North Bossier (k)						
Cat Island (l)	12.8					12.8
State of Arkansas, aiding in the protection of Louisiana	71.8				(m)83.9	155.7
Outside of Levee Districts	(n) 11.1	(o) 33.1				44.2
Total by Streams	842.9	238.4	79.4	149.1	294.1	1,603.9

a. Includes 10.5 miles on Ouachita River, 17 miles on Black River and 13 miles on Little River.

b. Includes 12.7 miles on Ouachita River and 26.3 miles on Tensas River.

c. and e. These systems, due to closure of bayou at head, pending construction of lock, in disuse at this time. Also since closure of Bayou Lafourche, cut through in many places for easy access to bayou for connecting canals.

d. Includes 0.27 miles of cross levee at head of system.

f. Rear levees, etc.
g. Along Gulf Coast, Parish of Plaquemines, east bank, includes 4 cross levees.
h. All on Bayou Pierre in disuse since closure of Tones Bayou.
i. Includes 1.5 miles at head of system on Bayou Rapides.
j. All on Bayou des Glaizes.
k. System not yet begun.
l. Fragmentary, built before organization of district. District not in operation.
m. Includes 71.4 miles on Arkansas River, from Pine Bluff, Ark., to lower end of Arkansas River system, and 12.5 miles on Amos Bayou and Cypress Bayou above head of system on Mississippi River.
n. Fragmentary length of levee lines on Red River.
o. Around Angola State Farm.

The Construction of Levees.

In the construction of levees in Louisiana, and that part of Arkansas affecting Louisiana, undertaken by the State and the levee districts of the State, the following general specifications, quoted from the "General Specifications and Conditions," usually maintain, viz.:

"3rd. The contractor assumes all risks from subsidence in foundation, or base, accidents, floods and casualties of every kind which may occur before the completion and acceptance of the work, and shall sustain all damage and injury that may be caused thereby.

"4th. No part of the work herein contracted for shall be given, sold, or assigned to a sub-contractor without the consent of the President of this Board, expressed in writing; nor shall said contractor or his sureties be releaed from personal and immediate responsibility without like consent.

"5th. The embankment shall be built of such material, and disposed and distributed in such manner as the engineer in charge may direct, under the requirements of the Board of State Engineers. The required allowance for shrinkage shall be added to the height of the embankment; this allowance to be at the discretion of the engineer in charge, up to one-fifth in excess of the net height of the embankment; it being understood that a cubic yard of embankment under this agreement is a net cubic yard of settled earth, and equal to five-sixths of a cubic yard of material in place, within the limits prescribed.

"6th. The contractor shall remove all trees, stumps, logs, roots, stalks, weeds, grass, trash and perishable matter of every kind not specially exempted from this requirement by instructions from the engineer in charge, and plow or spade up the ground over

the entire surface to be covered by the embankment. He shall grub up by the roots all trees and stumps within the limits of the base of the embankment, and three feet on either side of the base. He shall remove all buried logs, brick or walls and other material considered unsuitable by the engineer in charge. He shall refill all holes made by grubbing or by the removal of unsuitable materials, as aforesaid, with solid earth up to the level of the natural surface of the ground, and the refilling of such holes shall not be paid for by the cubic yard (except in special cases, when so directed by the engineer in charge), but shall be considered as a part of the clearing and grubbing to be done as incidental or auxiliary work, payment for which shall be included in the price per cubic yard of embankment hereinafter stipulated. He shall carefully clean all ditches crossing the line of embankment, and fill them with solid earth up to the level of the natural surface of the ground for a distance of twenty (20) feet from the base of the embankment on the land side, and for the width of the berme prescribed on the river side. He shall cut muck ditches of such depth and size as may be prescribed by the engineer in charge. If required by the engineer in charge, the clearing, grubbing, preparation of base and cuttng of muck ditch, as above, shall be completed, and the muck ditch refilled throughout the whole length of the embankment, or any part thereof, before the embankment be begun. In the construction of the embankment he shall, except where other material may be ordered by the engineer in charge, use earth only, and shall place it in layers of such thickness as may be directed by the engineer in charge, and extending the full width of the embankment. Except when otherwise granted permission in writing by the engineer in charge, he shall obtain all earth from the river side of the embankment, leaving a berme of the natural surface of the ground .....feet wide between the base of the embankment and the borrow pits. Unless otherwise directed by the engineer in charge, all borrow pits shall be sloped on the side nearest the embankmnnt not steeper than three (3) horizontal to one (1) vertical, and on that side shall not be deeper than three (3) feet, from which point the bottom of the pit may slope away from the berme on a slope not steeper than seven (7) feet vertical in one hundred (100) feet horizontal for one hundred (100) feet, at which point and beyond, the depth of the pit, for such width as may be required to supply material for the embankment, shall not exceed ten (10) feet below the natural surface

of the ground. At intervals not greater than three hundred (300) feet, 'traverses' of the natural surface of the ground, not less than twenty (20) feet wide, shall be left undisturbed, extending entirely across the pits, except that a ditch of such dimensions as may be directed by the engineer in charge shall be cut through the 'traverses,' on the side of the pit next to the river, to allow drainage from one pit or part of pit to another. He shall plant the entire surface of the completed embankment with living roots or sods of Bermuda grass, not more than one (1) foot apart, and to the satisfaction of the engineer in charge. He shall cut down all trees, bushes and saplings for a width of one hundred (100) feet on each side of the embankment where it runs through woods or timber, and, in open land, he shall cut down such trees, etc., within one hundred (100) feet of the embankment as the engineer in charge may direct. Unless otherwise directed, he shall cut all trees and stumps within twenty-five feet of the base of the embankment on the land side, down to the level of the ground (but shall not disturb or destroy the engineer's bench marks or other reference points), and shall leave the ground clear of all fallen timber, brush or other debris or material obstructing free passage along the base of the embankment on the land side for a width of twenty-five feet. He shall take care to preserve the engineer's stakes and bench marks, and shall at all times keep the station stakes at or opposite their proper location. If required by the Engineer in charge, he shall dig a drainage ditch on the land side of the embankment, of such dimensions and at such distance from the base as may be prescribed, but shall not otherwise break up the surface of the ground on the land side of the embankment, except by written permission of the Engineer in charge. He shall cut such openings through the old embankment or embankments as may be required by the Engineer in charge. When required by the Engineer in charge, the earth taken from openings made through the old embankment and from drainage ditches, shall be deposited in the embankment under construction, in which case it shall be paid for as embankment only, but otherwise it shall be measured and paid for in excavation. Except by special permission of the Engineer in charge, all existing embankments, or parts of old embankments, must be left undisturbed."

In the matter of grade, the provisional grade adopted by the Mississippi River Commission is observed, except where the latter

is less than 3.0 feet above the highest water of record, in which case a grade of not less than 3.0 feet above the highest water of record is observed.

In the matter of cross sections, slopes of 2 and 3 to 1, 3 and 2 to 1, 2½ and 2½ to 1, 3 and 3 to 1, 3 and 4 to 1, and 3 and 10 to 1, with width of crown varying from 4 to 50 feet, dependent upon location, height of levee, stability of bank, whether the embankment requires protection by revetment or not, the availability of means, etc., are in practice.

By law, banquettes are required to be built over all bayous or sloughs crossed by levees. Banquettes have also been generally prescribed across depressions of the ground in marked contrast with the general elevation of the natural surface in the vicinity of the levee; also where the general height of a levee exceeds 15 feet. Such banquettes are, as a rule, located along the land side of the line of levee, forming part of its land side base. A disposition, however, continues to gain favor to as much as possible avoid the construction of banquettes, and, in lieu thereof, adopt flatter slopes.

Where lines of levee are generally exposed to wave-wash, due to wind, the passage of steamers, etc., wooden revetments are, where practicable and the means are available, built and maintained by the State and levee districts.

During the past four years, the United States, when called upon to protect from wave-wash lines of levee built under its direction, on the "Lower Coast" (the Mississippi River, below New Orleans), has been considering various forms of revetment, notably paving the entire river side slope of the levee with a layer of concrete. So far, such paving as has been so done presents a fine appearance, and is performing its offices satisfactorily.

The earth utilized in building the levees of the State by the levee districts and the State continues to be moved mostly by scrapers drawn by mules. Wagons and graders are, in some instances, used in conjunction with scrapers. Men with wheelbarrows come next in order of volume of work accomplished, while, comparatively speaking, power-driven machinery does not yet seem to have improved its opportunities, nor contributed as much towards the accomplishment of material results as it undoubtedly should.

During the past two years, the work performed by the districts and the State, by the various methods employed, was (exclusive of the Orleans Levee District) as follows: By scrapers drawn by mules, 66 per cent; by men with wheelbarrows, 20 per cent; and by power-driven machinery, 14 per cent.

The average cost of the levee work performed by the levee districts and the State, by all methods, during the past two years, was (exclusive of the Orleans Levee District) 21.46 cents per cubic yard; and by the three methods named, as follows: By scrapers drawn by mules, 21.02 cents per cubic yard; by men with wheelbarrows, 24.19 cents per cubic yard, and by power-driven machinery, 18.60 cents per cubic yard.

Supervision, Care and Maintenance of Levees.

The present status of operations, for the supervision, care and maintenance of levees in the State, by the levee districts and the State, is not materially different from that described in the previous reports of this Board, and the references to the subject heretofore made are so nearly equally applicable at this time, that the Board of State Engineers takes the liberty of herein simply reproducing, with some minor corrections, its former remarks under this head, viz:

The work of construction proper having so far generally engaged and almost entirely absorbed the attention, efforts and resources of the levee districts of the State, the correlative proposition of supervision, care and maintenance has not everywhere yet received the material thought and consideration which it unquestionably demands.

It has in the past been primarily imperative, on the part of all interested, to build and to enlarge—the care and preservation of the work accomplished being generally regarded as largely a matter of secondary consideration, and, in consequence, has, in many localities, been up to this time treated in a more or less tentative and desultory way.

The Board of State Engineers regards this to be an unwise policy to continue to pursue, and urges a more serious consideration of the subject in the future.

There exists in this State alone to-day, some 1448.2 miles of levees, monuments to the foresight, broad-mindedness, courage and energy

of its people, but it cannot be recorded that the safeguards against their abuse and deterioration, provided by law, have everywhere yet been taken advantage of, nor put into practice.

The levee districts of the State and the Police Juries of Parishes within the levee districts, are specifically charged by law with the duty of protcting, preserving and maintaining the public levees of the State, no matter under what authority constructed; but, for the most part, in some of the levee districts, the authorities in this respect are not yet making much more than partial effort, and in others none at all.

The Board of State Engineers, therefore, feels it incumbent upon itself to herein lay stress upon this fact, and to again put itself on record by reiterating its often-expressed views on the subject, by urging with renewed emphasis that the time should, beyond question, no longer be delayed by these official bodies in seriously considering and formulating plans for more systematically, comprehensively, economically and effectively carrying out this fundamental principle of preserving and maintaining their lines of defense against overflow than heretofore.

More systematic organization for the constant supervision, care and maintenance of the levee lines than now prevails must, sooner or later, be adopted, not only by the levee districts, but by the United States as well, and the earlier the better. Work of a more or less serious character, and of greater or less extent, in one place and then another, along all the lines of levees in the State, is needed throughout the course of the year.

Without going into any specific detail about method and appliance, this should be undertaken and performed by permanent forces, suitably organized and properly equipped, on lines similar in most respects to the railroad section-gang system.

The various classes of work required, being also peculiar to the season, each class should and could be thus disposed of during the season when the best results will follow. These section gangs could be made the nucleus of high-water forces in the spring; then, upon the subsidence of the waters, of repair forces, to perform all work of a minor character incident to and following periods of high water, such as removing drift, restoring wave-wash, drainage, re-sodding embankments, where necessary, and collecting and storing all tools and materials. All weed-cutting could, at the proper time, also be done by such gangs, the patrolling of the

levee lines at all times, as well as seeing that the laws for their preservation and maintenance are strictly and impartially enforced, and perform generally other auxiliary work, even to assisting engineering parties in field operations.

The Levee Districts.

The regularly incorporated levee districts in the State number, at this date, seventeen, all of which, except two—the North Bossier Levee District and the Cat Island Levee District—are in active operation.

All these districts possess corporate powers, exercised under the administration of Boards of Commissioners, varying in number from three to nine; and all, except the Orleans Levee District, are empowered to levy ad valorem taxes for levee purposes, not exceeding the constitutional limit of ten mills on the dollar. The Orleans Levee District is restricted to an ad valorem tax of one mill on the dollar. Most of the districts also have power to levy assessments or forced contributions upon agricultural products raised within their territory, and upon railroads of standard gauge, while some of them, the boundaries of which touch upon the Gulf Coast, and bays, may impose a local assessment or forced contribution upon oysters. All of the levee districts have authority to issue bonds. The aggregate of district levee bonds now authorized in all the districts is $8,550.000, of which $7,457,400 is, at this time, outstanding. The total assessed valuation of the same levee districts (exclusive of the Cat Island Levee District, in which no local assessments have so far been made), as shown on the tax rolls of 1909, is $309,407,824.

A general description of the levee districts in the State, so far authorized by law, with statistical and other information of interest relating to them, follows: It should be explained that the cost of the levee work done during the past two years, and remaining, at this date to be done under existing contracts, shown in the following statements, is, in the first case, inclusive of, and, in the second case, exclusive of, percentages retained until completion.

1. *The Tensas Basin Levee District*: Composed of the Parishes of Morehouse, West Carroll, Richland, Franklin and Catahoula, with those portions of Ouachita and Caldwell Parishes lying east of the Ouachita River. As the overflows to which the

district is most liable result from flood waters escaping from the Arkansas and Mississippi Rivers, in Arkansas, authority in law is given to it to apply its resources to the construction, improvement and maintenance of such lines of levee in the State of Arkansas, south of the Arkansas River, as, in the judgment of the Board of Commissioners, concurred in by the Board of State Engineers, are recognized to possess a material bearing upon the protection of the district.

The United States "Upper Tensas District" includes the same levee line, and the larger part of the levee work done on it continues to be contributed by the United States.

The lengths of the lines of levee upon which this district directly depends for protection from overflow, and towards the construction and maintenance of which it directs its financial aid, are as follows: On Amos Bayou Ridge and Cypress Creek, 12.5 miles; the Mississippi River, from the mouth of Cypress Creek to the State line, 71.8 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of seven members, one being appointed from each Parish, or part of Parish, in the district.

The domicile of the Board is at Rayville, Richland Parish, La.

The district taxes and forced contributions permitted by law to be levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions, etc., thereon.

Forced Contributions: Five cents per acre on all land within the district; $60 per mile of standard gauge railroad, and $30 per mile on railroads of less than standard gauge.

In addition to the foregoing resources of the district, 10 per cent of the General Engineer Fund 17/20 of a mill general State tax) is required by law to be set aside and expended annually in the interest of the district.

The authorized bonded debt of the district is $150,000, of which $65,000 is, at this time, outstanding.

The assessed valuation on the tax rolls for 1908 and 1909 was $6,340.478 and $6,745,076, respectively.

The amount and cost of the levee work done in the district, and in that part of Arkansas affecting the district, during the past two years, by the district, and the United States, is approximately as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	1.61	4.55	727,612	$170,372.55
By the United States	3.36	16.46	796,710	211,565.58
Totals	4.97	21.01	1,524,322	$381,938.13

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done is approximately as follows: 258,810 cubic yards, to cost about $69,197.07.

In addition to the foregoing, the district, during the same period, expended, in minor repairs, and for the care, preservation and protection of its lines of levee generally $447.78.

The United States, in bank protection work, along reaches of the Arkansas and Mississippi Rivers, in Arkansas, affecting levees in which the Tensas Basin Levee District is interested, also entered upon projects involving large outlays of money.

Act No. 59, of 1886, authorizing the organization and operation of the Tensas Basin Levee District, recites "That the Board of Commissioners of the Tensas Basin Levee District shall have the right to join in with any levee district embracing the Counties of Chicot and Desha, in the State of Arkansas, for mutual protection, in compliance with Article 216 of the Constitution." In this way, the Tensas Basin Levee District has contributed towards the construction, improvement and maintenance of all that line of levee in Desha County, extending from Costello's Gin, on Amos Bayou Ridge, to Lucca Landing, on the Mississipi River, and thence down the Mississippi River through Desha and Chicot Counties to the Arkansas-Louisiana line. The head of the system at Costello's Gin ends abruptly with a levee about four feet in height. At stages of the Mississippi River, exceeding 51 feet on the gauge at Arkansas City, a considerable flow runs around the head of this system, averaging for a distance of about 12 miles some 3 feet and more in depth, and in several of the small bayous crossing the line as much as 10 feet in depth. It has for years

past been the desire of the Tensas Basin Levee District to extend this line westward from Costello's Gin to higher ground—a movement looked upon with favor by the Mississippi River Commission, a large part of Desha and all of Chicot County. But, owing to the objections raised by the levee districts north of this line, it has so far been impossible to obtain rights of way to permit this. Instead, strong effort has been constantly made by the same parties in interest in Arkansas to secure the construction of a cross levee to join the lower terminus of the system extending down the Arkansas River, from Pine Bluff to Jefferson Lake, with the system along Amos Bayou and Cypress Creek, at or near Boggy Bayou.

This would demand the re-opening of Boggy Bayou, and the establishment and maintenance of an extensive line of drainage work to provide relief from precipitation in the rainsheds above, which would, at the same time, during periods of high water in the Arkansas River, again subject the Tensas Basin Levee District to liability to overflow in the event of the failure, as was so notably the case in the past, of the levee line along the south bank of the Arkansas River, from Pine Bluff to the mouth of the river, a danger which, under present exsiting conditions, is now practically reduced to a minimum.

Thus it is still the opinion and earnest hope of the Tensas Basin Levee District that, until the line of levee, on the Arkansas River, from Pine Bluff to the mouth of the river, has been so improved as to compare in safety and integrity with that afforded by the present line on Amos Bayou, Cypress Creek and the Mississippi River, in Arkansas, that no immediate departure from the present status of affairs be considered.

In regard to the present condition of the line of levee on the Arkansas River, it is gratifying to be able to record that the local levee districts engaged in improving it continue to make appreciable headway towards bringing about, at no distant day, conditions tending to harmonize the situation from every point of view.

By agreement between the United States Engineers and the Board of State Engineers, all levee work recently undertaken on the Mississippi River, in Arkansas, affecting the Tensas Basin Levee District, is being constructed to a grade four feet above the high water of 1903, with crown of 8 feet wide, and slopes of 3 and 3 to 1.

The condition of this line of levee, with reference to this agreement, is, at this date, about as shown in the following statement, viz:

COUNTY	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	4 to 5 Feet above High Water	Total Miles in County	Cubic Yards required to conform to Mississippi River Commission Provisional Grade.
	Miles	Miles	Miles	Miles	Miles	
Desha	3.3	12.7	3.7	7.8	27.5	1,033.000
Chicot	--------	20.0	22.0	12.5	54.5	2,056.000
Totals	3.3	32.7	25.7	20.3	82.00	3,089.000
Percentages	4%	40%	31%	25%		

Provisional grade recommened by the Mississippi River Commission: 4 feet above high water, with light topping of 1½ feet in addition.

There does not appear, at this time, to be anything in the way of new levees required, in the immediate future, along this line of levee, except possibly at Lucca Landing, which, when decided upon, will call for something like 300,000 cubic yards of earthwork.

There are, however, several localities at which the necessity for bank protection grows more acute with each recurring season. Among these may be mentioned, in their order down stream, first, Chicot Front, where, through the combined efforts of the United States and the Tensas Basin Levee District, an important and extensive line of new levee is approaching completion, which, unless the caving in this reach be arrested in the near future, will itself, in turn, be threatened at no distant day, necessitating another line of new levee of much greater extent, surrounded by even greater difficulties in construction; second, Panther Forest and Vaucluse, where it would appear that unless the revetment work already placed there be extended, serious injury may result not only to the existing revetments, but to the line of levee besides; and last, but not least, Grand Lake, in Matthews Bend, where, unless very decided changes for the better develop in the near future, bank protection or another extensive line of levee of difficult construction must be considered.

Of the four contracts on the Mississippi River, entered into previous to, and not completed April 20, 1908, three have since

been finished and received from the contractors, that is Chicot Front Extension, Chicot Front to Arkansas City, in Desha County, and Vancluse, in Chicot County, leaving one contract (entered into previous to April 20, 1908,) Chicot Front, not yet finished. About 2,300 feet of this levee runs through a cypress brake, and the construction of that portion of the line has been very slow and difficult on account of the long haul, the seepage during high water periods in the river, and rains filling the swamps in front of the new levee line. In fact, it was found necessary, in order to afford drainage during low water times, to cut the front line of levee. This cut in the front line had, of course, to be refilled at each rise in the river, thus cutting off the drainage, and, generally, stopping further construction work.

The new levee at Chicot Front was rendered necessary by the caving of the bank, and, when undertaken, it was believed that it would probably be necessary to build a temporary run-around, pending the completion of the main line. Fortunately, however, the caving was not as rapid as apprehended, and it has not been necessary to build run-arounds. The contract for this work would have been completed this season but for the very bad weather which prevailed in January and February, and the sloughing of some 300 feet of the river slope of the embankment, which could not be immediately restored because of the necessity of closing the gap in the front line of levee, cut for the purpose of affording drainage at times when the river remained at stages permitting it.

Since April 20, 1908, two contracts have been entered into, one for the enlargement of the Fulton Lake Levee, just below Arkansas City, and the other for the construction of a new levee at Gaines Landing, about 12 miles below Arkansas City.

The work contemplated under the Fulton Lake contract consists of enlarging the section of the levee, and placing a six-foot crown capping on top of the enlargement crown, for the double purpose of securing grade and to prevent travel on top of the levee. This levee, being situated so close to Arkansas City, and there being no good roads through the swamps on the land side, it has been very difficult to keep traffic off of same. With the exception of the digging of a ditch to drain the pits into the river, no work has yet been done under this contract, and, on account of inclement weather conditions, and the approach of the season of high water, none is likely to be done until after that period.

The Gaines Landing New Levee, which was rendered necessary by a pocket cave reaching within eighty feet of the base of the old levee, has been completed.

The Desha and Chicot Levee Boards have contributed materially towards the enlargement, care and maintenance of the levee lines in their respective territories, but it is with reget that it must still be recorded that so far these authorities have made little headway in keeping hogs from depredating upon the levees. A failure to do so results in the destruction of sod, with attendant rain and wave-wash and loss of section. The depredation is especially severe in the sandy levees.

Parties in interest in Desha County have organized and dug a drainage canal from Arkansas City to Boggy Bayou, opening up the lower end of the bayou. This has appreciably lowered the water in Boggy Bayou and drained much water out of the swamps. This canal extends down to Chicot County, but, unfortunately, no decided step has yet been taken by that county towards carrying out that much desired part of the project.

In addition to the work in Arkansas, protecting the district, the Sandy Bayou and Cypress Slough Dikes, in Caldwell Parish, contracts for the construction of which were entered into previous to April 20, 1908, have been completed, and contracts have been entered into since April 20, 1908 for the closure of the Bouef River cut-offs in Morehouse and Richland Parishes. It was represented that a large quantity of water went through these cut-offs into Lake Lafourche during the rainy season, which did a great deal of damage in Morehouse and Richland Parishes. It was, therefore, thought advisable to build these dikes to a grade high enough to simply confine the rainfall in the valley to Boeuf River, but not such waters as might result from crevasses in the systems of levees on which the district is dependent for protection from overflow during periods of high water in the Arkansas and Mississippi Rivers. About 80 per cent. of the number of cubic yards required to close cut off No. 1 has been placed in position, but work has now been suspended on account of unfavorable weather. Nothing has been done on cut-offs Nos. 2 and 3.

2. *The Fifth Louisiana Levee District:* Composed of the Parishes of East Carroll, Madison, Tensas and Concordia.

That part of the levee in the district, extending from the Arkansas line to a point opposite Warrenton, Miss., is included in the United States "Upper Tensas District," and that below

said point, extending to the mouth of Red River, coincides with the United States "Lower Tensas District."

The total length of the levee line in the district at this date is about 239.5 miles, the present lower terminus of the system being within eight miles of the mouth of Red River.

The affairs of the district are conducted by a Board of Commissioners composed of eight members, two from each parish.

The domicile of the district is at Delta, Madison Parish, La.; postoffice address of the President of the Board of Commissioners, Tallulah, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $100.00 per mile on railroads of standard gauge, $20.00 per mile on railroads of less than standard gauge, and $1.00 per bale on all cotton grown within the district.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.

The assessed valuation of the district on the tax rolls of 1908 and 1909 was $9,949,530 and $9,107,604, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district, the State and the United States is approximately as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	3.75	15.47	1,294,497	$313,173.16
By the State	2.31	8.81	781,108	173,884.76
By the United States	4.80	12.59	2,188,524	568,167.49
Totals	10.86	36.87	4,264,129	$1,055,225.41

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district is approximately as follows:

By the District, 74,139 cubic yards, costing.....$ 24,334.22
By the State, 533,889 cubic yards, costing..... 114,896.56

Totals .....608,028 cubic yards, costing.....$139,230.78

In addition to the foregoing, the district, during the same period, expended in minor repairs and for the care, protection and preservation of its line of levee generally, including drainage of battures, etc., $24,024.36, and for protection work during high water $695.95, while the United States assumed the construction of bank protection work in the district, involving further large expenditures.

The condition of the levee line in this district, with regard to grade and section, is at this time about as shown in the following statement, viz:

PARISH	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	4 to 5 Feet above High Water	5 to 6 Feet above High Water	6 Feet and over above High Water	Total Miles in Parish	Cubic Yards required to conform to Mississippi River Commission Provisional Grade.
	Miles	Miles	Miles	Miles	Miles	Miles		
East Carroll	------	13.3	13.2	29.4	------	------	55.9	1,012,000
Madison	1.8	13.0	11.4	16.4	------	------	42.6	1,313,000
Tensas	------	13.0	15.0	7.4	23.6	------	59.0	1,410,000
Concordia	------	2.7	21.6	17.9	32.6	7.2	82.0	1,193,000
Totals	1.8	42.0	61.2	71.1	56.2	7.2	239.5	4,928,000
Percentages	1%	17%	25%	30%	24%	3%		

Provisional Grade recommended by the Mississippi River Commission: 4.0 feet above high water in East Carroll and Madison Parishes; 5.0 feet above at Bedford; 5.5 feet above at L'Argent; 6.1 feet above at Vidalia, and 5.1 feet above at Bougere, with light topping of 1½ feet in addition, from the Arkansas State line to opposite Warrenton, Miss.

It appears, at this time, evident that new levees will shortly be required in this district, some this season, at Atherton, in East Carroll Parish; Mascot, Morancy Duckport and Reid-Biggs, in Madison Parish, and Sycamore and Kinmore, in Concordia Parish, aggregating some 1,810,000 cubic yards, if built upon twenty-year locations.

Conditions appealing for bank protection work, of greater or less extent, dependent upon developments, also exist, either as new projects or extensions to former projects, at Lake Providence, Delta Point, Reid-Biggs, Bondurant Chute, Kempe, Stockridge, Hardtimes, Marengo Bend, and Natchez Island.

Among the foregoing, it is desired to lay particular stress upon conditions in Reid-Biggs Bend, where it is manifest that, unless revetment in that bend be promptly materially extended a new levee must this season be undertaken, which, in itself, will not only be of a most expensive and difficult character to construct, but also prove but another temporizing step in advance of a still more difficult and expensive line of work at no very distant date in the future.

During the period covered by this report, the river did not reach extreme heights along the front of the Fifth Louisiana Levee District, the maximum reading on the Vicksburg gauge being about 48 feet. However, during quite a long period, from March 11 to July 15, in 1908, and from March 9 to July 3, in 1909, the river at Vicksburg remained above 40 feet. All enlargement work had, therefore, to be discontinued at an early date, and could not be resumed until late in the season. The long period during which the water remained against the levees, also caused a considerable amount of wave-wash on new work. Notwithstanding these short seasons, however, considerable work was accomplished in the parishes of the district.

Work of the Past Two Years.

In East Carroll Parish, a new levee, rendered necessary by caving banks, was built at Cottonwood; the line was raised and enlarged to Mississippi River Commission provisional grade from the State line to Pilcher's Landing, and at Wilson Point, Longwood, Cottonwood, Maguire and Point Lookout. The spur at O'Possum Point was repaired, and new spurs built at Point Lookout, to prevent the current from washing into and enlarging what is known as the "blue hole," and thus endangering the line of levee; traverses also had to be built at Concord and Point Lookout, where the borrow pits were washing out and cutting into the base of the new levee, and repair work, consisting of restoring wave-wash, was done at Lake Providence and Maguire. All work in this parish has been completed, except the Cottonwood Enlargement.

The contract for the enlargement of the line from Maguire to Hollybrook was closed out, terminating the work at Desona. This became necessary by reason of the fact that the Penitentiary forces, which were to return to the work this season, were called into service on the more important and immediate work at Cabin Teele.

In Madison Parish, new levees, rendered necessary by caving banks, were built at Morancy, Cabin Teele and Duckport; the Christmas Levee was enlarged, part of this work being really a new levee, as the line was changed and the old levee turned over; the construction of a land side banquette along the Martin to Bedford levee, and the topping of the Diamond Island Levee were undertaken, and the Reid-Biggs levee was repaired. All contracts in the Parish have been completed, except the Martin to Bedford Banquette and the Diamond Island Topping. On the latter, work had to be suspended on account of the bad weather in January and February, but it is hoped that operations may shortly be resumed there.

In Tensas Parish, a new levee has been undertaken at Inge Field, on account of the caving bank. This, although not very rapid nor aggravated, was sufficient to warrant the commencement of a new levee there this season, upon which work has just been started. The line from Kempe to Stockridge was raised and enlarged, and a spur was built at Hardtimes to arrest the deepening of the borrow pits and cutting away of the river slope of the old levee.

In Concordia Parish, in consequence of caving banks, it was found necessary to undertake a new levee at Sycamore, and to cooperate with the United States in the construction of a long line of levee at Greens. Accordingly, contracts have been entered into by the State for the construction of those parts of the line located at the upper and lower ends, and by the United States Government for the balance of the line. When this long line of new levee at Green's was decided upon, the necessity of constructing one or more emergency loops, pending its completion, was recognized as probable, and one such loop was constructed by the district just prior to the high water of 1909. So far, this year, the necessity for other emergency loops at Green's has not presented itself, but there is no certainty but that at least one more may become so before the subsidence of the high water of this year.

The line has been raised and enlarged at Rifle Point, and from Minorca to Palo Alto, a banquette built at Glasscock and repairs have been made to the Lake Concordia Levee.

Caving Banks.

At Cottonwood and Atherton, in East Carroll Parish, the caving has not been as rapid as was anticipated. It was, however, thought advisable to build the new levee at Cottonwood, and it is quite likely that a new levee will also have to be built at Atherton next season.

In Madison Parish, caving begins below Henderson and continues down to Mascot, at which place a new levee will probably soon be required. Caving still continues at Cabin Teele, and it is probable that the new levee just completed there may have to be extended both up and down stream in a few years. A pocket cave took place during the last high water at Duckport, and it looked for a while as though it would be necessary to build a new levee there, but the caving has traveled down stream and any new levee now undertaken will probably be located lower down than at first thought, and consist of an extension to the last loop built at Duckport.

Caving still steadily continues at points in Reid-Biggs Bend, although not very actively. If the Government appropriation becomes available in time to permit the extension of the revetment already there up stream, it will not be necessary to build a loop at this point; otherwise it seems evident that a long line of difficult construction and large cost, as more than once already enlarged upon in the reports of the Board, will, at no distant date, become imperative.

In Tensas Parish caving has been very active at Hardtimes, and if the bank is not revetted it will not be many years before the levee just completed, which is very near to an old lake bed, will be in danger of being breached. The river bank just below St. Joseph has been gradually dropping off, necessitating the undertaking of a new levee at Inge Field. The situation at Kempe, where revetment work has been undertaken by the United States, remains unchanged, excepting that the caving has moved down stream, necessitating the extension of the mattress work along the Melwood front.

Caving has been quite active in Concordia Parish, beginning at the upper end of the Parish at L'Argent. At Sycamore, it has

been very active, in consequence of which a new levee has just been completed there. In fact, so rapid was the recession of the river bank here that it was feared that the point would cave away before the new levee could be completed. Unless this bend be revetted in the near future, the new levee will have to be very soon extended down stream and several new levees will have to follow in the near future. Conditions at Natchez Island are also getting serious, and there seems little question but that a new levee will also have to be built there in the near future. There has been a great deal of caving at Green's, necessitating the construction of a long line of new levee, already described.

Within the past two years, a new agricultural pursuit has been added to those previously followed in the district, namely, the cultivation of rice.

In connection with this, irrigation from the Mississippi River, by means of siphons, was, as a general proposition, necessary, and resorted to, in the use and regulation of which the following recommendations, submitted by the Board of State Engineers, were adopted by the Fifth Louisiana Levee District, and made public in the form of a printed circular addressed to all known to have an interest in the premises, and to such as might from time to time, apply for authority to place siphons over the levees, viz:

"State of Louisiana,
Office Board of State Engineers,
New Orleans, La., February 11, 1909.

Regulations Recommended by the Board of State Engineers to govern the use of siphons in delivering water over the public levees for the purposes of irrigation in the Fifth Louisiana Levee District.

"First. The flooding of large areas of batture, and the ponding of water against the public levee for any considerable length of time is recognized as harmful. In order to as much as possible minimize the dangers to the public levee system arising from this, whenever water be permitted, by the Fifth Louisiana Levee District, to be carried from the Mississippi River, over the public levee, by means of siphons and pumps, requiring reservoirs in connection therewith, a banquette shall be constructed along the levee to the full width of the reservoir, the width of said banquette to be not less than twenty (20) feet, grade not less than two (2) feet above the surface to which it may be desired to raise the

water in the reservoir, and the water from the river shall be brought to the said reservoir or the intake of the siphon through a ditch leveed on both sides, or through an artificial canal above the natural surface of the batture. The maximum width to be allowed for any reservoir, or ditch, or raised canal, between levees, shall not exceed one hundred (100) feet, extending from the intake of the siphon to the pump. The levees built along the sides of any reservoir or channel way shall be of sufficient grade and section to safely carry the water from the pump to the siphon intake, and should such levees break at any time during the pumping season, and cause the flooding of any greater area of batture than that covered by the reservoir or channel-way, pumping shall promptly cease and the levee be repaired.

"Second. All pipes or siphons crossing the crown of the levee shall be provided with approaches, to permit riding or driving along the top of the levee for purposes of inspection, and the hauling of materials during periods of high water.

(a) Such pipes or siphons, or their supports, shall not in any mannner cut into the crown of the levee, but shall be placed upon sleepers, resting upon earthen ramps, as shown on plan.

(b) After the pipes or siphons are thus placed, earth approaches shall be built on each side of such pipes or siphons, the height of which shall not be less than one foot above the top of the pipe or siphon, and extend on each side of the center of such pipes or siphons a distance equal to eight times the height of the top of the ramp above the crown of the levee, thus providing inclines of easy access over such pipes or siphons. See plan.

(c) No upright pump or pipe connected with the top of such pipes or siphons for the purpose of priming shall be placed over the crown of the levee, but to one or the other edge of the crown, so as not to interfere with passage over the top of the levee. See plan.

"Third. All pipes or siphons placed and used for purposes of irrigation over the public levees of the Fifth Louisiana

Levee District, bordering on the Mississippi River, shall be constructed to conform to the earthen ramps prescribed and shown on plan, and shall be made of such length and in such manner as to deliver water at a distance of not less than twenty-seven (27) feet from the base of the public levee or banquette so crossed. No public levee shall be cut into or otherwise altered for the purpose of making it conform to the shape of any siphon or pipe crossing the same."

A map, illustrating in detail the foregoing recommendations, and requirements, was furnished with the circular, or to any one in interest applying for the same.

Coincident with levee construction it is important to keep the line of levee well drained and policed, and to provide drainage to overcome the injurious effects of sipage water accumulating along the land side of the embankment, softening it at the base and endangering its solidity during high water. Again, during low water, drainage should be provided for the borrow pits on the river side of the embankment, not only to keep the river side slope of the levee dry, but to leave no inducements to muskrats, crayfish and other burrowing animals to harbor in the pits, as well as also to check the tendency of the water in the pits to sipe through the ground into the river when low, thus washing away the sand strata and causing sinking and caving of the bank.

In the construction of new levees, and where it has been found practicable in enlarging existing levees and building banquettes, a part of the earth required has generally been taken from the land side of the levee, in the form of a continuous canal, excavated to prescribed dimensions to serve as a drain ditch. Unfortunately, however, in many places, it has been found impracticable, on account of the absence of outlets, to properly relieve the canal, leaving the water accumulating in the lower places, to be disposed of by evaporation and the slow process of absorption, only.

The Fifth Louisiana Levee District, realizing the importance

of drainage, passed a resolution at one of its meetings, requesting its President to call a meeting of the Presidents of Police Juries of the various Parishes in the district and others interested, to discuss the question and devise plans to effect the drainage of the district. A largely attended meeting followed at Tallulah, and, after hearing the views of several prominent gentlemen on the subject, it was decided to appoint a Committee to consider the matter and prepare a bill for submission to the coming Legislature. The Fifth Louisiana Levee District being so vitally interested in the matter of drainage, and possessing, as it does, the confidence of the people interested, in having always so well administered the funds placed in its charge, bringing the levee system of the district to its present high state of efficiency, it might be well to consider the advisability of additionally charging the district with the duty of drainage.

The policing of the levees in the district has presented a problem for grave and constant study. It has been found that the pasturing of cattle on the levees, except during periods of high water, has been of great benefit to the levees, keeping down the grass, weeds, etc., thereby permitting the rainwater to run off rapidly, and exposing the surface of the levee to the air and sun, so that it may dry out. The Levee Board has thus encouraged the pasturing of cattle on the levees, and in some instances has even gone to the extent of furnishing the wire for the fences on the land side of the levee. This not only insures the maintenance of cattle on the levees, but also precludes travel on them. Notwithstanding the fact that it is contrary to law to ride or drive on the levees, the roads, in places, are in such impassable condition, especially during periods of high water, that it becomes almost an impossible task to prevent the use of the levee as a general highway.

3. *The Atchafalaya Basin Levee District*: Composed of the Parishes of Pointe Coupe, West Baton Rouge, and Terrebonne, and parts of the Parishes of Iberville, Ascension, Assumption, Lafourche, St. Martin, St. Mary, Iberia, and St. Landry.

The district coincides with the United States "Atchafalaya District."

The district has a frontage on the right bank of the Mississippi River of 122 miles, extending from Torras to Donaldsonville; on Old River, of 7.0 miles; and on the Atchafalaya River, along its left bank, from Barbres to its mouth, of about 160 miles, and of about 120 miles on its right bank, extending from Bayou Courtableau to the mouth of the river, of which only about 43 miles of the left bank of the river, from Barbres to Bayou Alabama, are leveed. The lengths of levee line in the district are: On the Atchafalaya River, 43 miles; on Old River, 7.0 miles; on the Mississippi River, 117 miles, and on Bayou Lafourche about 75 miles. Since December 10, 1903, however, Bayou Lafourche has been divorced from the Mississippi River, by the construction of an earthen dam (preliminary to the construction of locks), and, therefore, the bayou is no longer subject to the fluctuations which rendered a levee line necessary along its banks.

The affairs of the district are conducted by a Board of Commissioners, consisting of seven members, three of whom are appointed from the Mississippi River Parishes, three from the interior Parishes and one at large on the recommendation of the railroads of the district.

The domicile of the district is at Port Allen, West Baton Rouge Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of ten mills on the dollar on all alluvial land subject to overflow in the district and possessions thereon.

Forced Contributions: Two and a half cents per acre on all land within the district; $60.00 per mile of railroad line; 25 cents per 1,000 pounds of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 4 cents per ton of cane when same is removed from the limits of the district, and beyond the limits

of any levee district in the State; 25 cents per bale of cotton; 2 cents per 100 pounds of seed cotton, when same is removed from the limits of the district, and beyond the limits of any other levee district of the State; 1¼ cents per sack of rough rice.

The authorized bonded debt of the district is $1,000,000, of which $850,000 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $23,627,667, and $24,659,953, respectively.

The amount and cost of the levee work done in the district during the past two years by the district, the State and the United State, is, approximately as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
ON THE MISSISSIPPI RIVER.				
By the District	3.03	11.76	1,721,221	$372,243.14
By the State	2.60	0.88	363,052	79,549.85
By the United States	0.67	------	172,101	38,907.19
Totals	6.30	12.64	2,256,374	$490,700.18
ON THE ATCHAFALAYA RIVER.				
By the District	5.21	5.62	903,647	$202,496.59
RECAPITULATION THROUGHOUT THE DISTRICT.				
By the District	8.24	17.38	2,624,868	$574,739.73
By the State	2.60	0.88	363,052	79,549.85
By the United States	0.67	------	172,101	38,907.19
Totals	11.51	18.26	3,160,021	$693,196.77

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, by the district, is as follows:

By the district, 612,900 cubic yards, amounting to $203,680.00.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its line of levees generally $82,402.60, and for protection work during high water $11,838.36.

The condition of the line of levee in this district, with regard to grade and section, is, at this time, about as shown in the following statements, viz:

PARISH	2 to 3 Feet above High Water	3 to 4 Feet above High Water	4 to 5 Feet above High Water	Total Miles in Parish	Cubic Yards required to conform to Mississippi River Commission Provisional Grade.
	Miles	Miles	Miles		
Pointe Coupee	2.0	0.8	46.7	49.5	98,000
West Baton Rouge	0.3	3.1	33.2	36 6	117,500
Iberville	0.9	------	26.5	27.4	60,000
Ascension	1.2	4.7	4.4	10.3	261,000
Totals	4.4	8.6	110.8	123.8	536,500
Percentages	3%	7%	90%		

Provisional Grade recommended by the Mississippi River Commission: 4.3 at Red River Landing, and 4.2 at Donaldsonville, above high water.

Four contracts, entered into previous to April 20, 1908, remained incompleted at that date, and were brought over into the period now under consideration. These were the Dameron & White, 1905, the Barbres to Port Barrow, the Alabama Island and the Raccourci contracts, the first three, district contracts, and the last named a State contract. All of these contracts have been completed within the period covered by this report, a large quantity of levee work being performed under each of them. Since April 20, 1908, eleven contracts for levee work in the Atchafalaya Basin Levee District have been entered into by the District and State, all of which, except the Upper Morganza and Alabama Bayou-Island contracts, have been completed.

The contract for the construction of the Upper Morganza Levee was entered into on January 29, 1910, and under its terms the levee must be completed on or before February 15, 1911. A large force of convicts is now engaged on the levee and the work is progressing satisfactorily. The contract for the construction of the

Alabama Bayou-Island Levee was entered into September 24, 1909, the work to be completed on or before March 1, 1910. Before the contractor could begin operations, however, certain parties, residing on the opposite side of the Atchafalaya River, protested to the United States Government against the closure of Alabama Bayou, which was contemplated under the contract, on the grounds that this bayou was a navigable stream, and under the jurisdiction of the United States. The Government ordered a suspension of the work, pending full investigation of the complaint.

After having thoroughly looked into the matter, the Secretary of War informed the Atchafalaya Basin Levee Board that the United States would not further oppose the closure of Alabama Bayou. In the meantime, however, the usual high water season in the Atchalafaya River was near at hand, and it was not deemed advisable to begin operations, and nothing has since been done under the contract.

Details of the work performed during the past two years in the Atchafalaya Basin Levee District will be found in Appendix "A."

The levee lines upon which the Atchafalaya Basin Levee District depends for protection from overflow may be said to compare advantageously with those of any other levee district in the State.

The question of maintenance, care and supervision of its levee lines has received the careful attention and consideration of the members of the Levee Board. The restoration of wave-wash, weed cutting, draining of borrow pits, and minor repairs to the levee lines, has generally been done under the immediate supervision of the President of the Board of Commissioners and the Chief Levee Inspector of the District, the results accomplished being very satisfactory.

The cultivation of rice, a comparatively new agricultural pursuit in the upper parishes of the district, and the siphoning or pumping of water from the river, over the levees, and the irrigation of the fields in connection therewith, has brought about conditions, which call for watchfulness on the part of the levee authorities to safeguard the levee interests. The law on the subject, and the rules and regulations adopted by the Atchafalaya Basin Levee District, provide ample protection for the levees, and it only remains for the planters to appreciate the importance

of strictly adhering to them, and for the authorities to enforce them. Act 98 of 1892, makes it unlawful to flood or cover with water, for the purpose of irrigation or otherwise, any land situated on the Mississippi River within 500 feet from the land base of any public levee. The same act also provides that the discharge end of all siphons on the Mississippi River must be located at a distance of not less than twenty-seven feet to the land side of the public levee. Besides these legislative enactments, the Atchafalaya Basin Levee District has adopted regulations governing the flooding of battures, which have been printed and distributed among the planters and others interested.

As will be seen by reference to the foregoing tabulated statement, the number of cubic yards still required to adjust the levee line of the district, on the Mississippi River, to Mississippi River Commission provisional grade is only about 536,500. In the past, the district, aided by the State and the United States, has done as much, and even more, than this amount of enlargement work on the Mississippi River in any one season, and it is, therefore, reasonable to expect that at the next biennial report of the Board of State Engineers, the Mississippi River levee line of the district will have been brought to Mississippi River Commission provisional grade and section.

It should not be overlooked, however, that the maintenance and extension of the levee line on the Atchafalaya River will call for large expenditures by the district for many years to come, and that the construction of new levees on the Mississippi River, rendered necessary by caving banks, will also call for additional large expenditures.

Owing to the long period during which the water remained against the levees in 1908, caving, along both the Atchafalaya River and Mississippi River fronts of the district, was unusually active after the subsidence of the high water, and necessitated the construction of many new levees in the district, as shown in the tabular statements of work performed. Besides the places at which caving necessitated the construction of new levees, the margin of safety, from caving, at the following named localities, is growing less and less, and new levees will, sooner or later, dependent upon future developments, be required there, viz: Smithland, Pointe Coupee Parish; St. Francis Church, Allendale, Belair, St. Delphine and Hickey, West Baton Rouge Parish; Alhambra, Iberville Parish; Philadelphia Point and McCall, As-

cension Parish, the aggregate contents of which, it is estimated, will approximate 1,500,000 cubic yards.

In the matter of giving protection against overflow to the lands, within the limits of the district, lying on the west side of the Atchafalaya River, it was found that certain data, necessary to the proper study of the question, and for the design of a comprehensive system of levees, giving the relief sought, was not at hand. In order to secure this information, a special survey of the basin lying between the Atchafalaya River, Bayou Courtableau, Grand Lake and Bayou Teche was undertaken. This survey has been completed and mapped, and fully meets the purposes for which it was intended.

This district, together with the Lafourche Levee District, is charged by law with the carrying out of certain projects for the improvement of Bayou Lafourche. The work performed during the past two years, in this direction is treated of separately under the heading of "Bayou Lafourche."

4. *The Cat Island Levee District:* Situated in the parish of West Feliciana. It comprises the territory on the east bank of the Mississippi River from Ratcliff's Landing to Bayou Sara. It was created by Act 110 of 1894, which provided for the appointment of five Levee Commissioners, and authorized the issuance of bonds to the amount of $100,000.

As stated in previous reports, surveys have shown that the cost of the levees necessary for the protection of this district would be excessive as compared with the probable revenues, and that, even after building an effective levee system, the drainage of the district during prolonged periods of high water could only be maintained by the operation of costly pumping machinery. Under these circumstances, no action has ever been taken by the Commissioners for raising funds or for undertaking levee work.

5. *Pontchartrain Levee District:* Composed of the alluvial lands on the east bank of the Mississippi River, between the cities of Baton Rouge and New Orleans, consisting of parts of the parishes of East Baton Rouge, Iberville, Ascension, St. James, St. John, St. Charles and Jefferson. Its situation is so favorable as to make it dependent for protection solely upon the integrity of its 126.1 miles of levee line on the Mississippi River front of the district, and upon its "Upper Protection" levee, extending from the main line of levee on the Mississippi River, back to the highlands.

The district is included in the United States "Pontchartrain District."

The affairs of the district are conducted by a Board of Commissioners consisting of nine members, one from each parish in the district, and one representative, respectively, of the Illinois Central Railway Company, and of the Louisville, New Orleans & Texas Railway Company.

The domicile of the district is at Convent, St. James Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the district, and possessions thereon.

Forced Contributions: Three cents per acre on all land other than that cultivated in sugar, cotton or rice (except swamp land subject to tidal overflow); 15 cents per barrel of sugar; 50 cents per hogshead of sugar; 5 cents per barrel of molasses; 3 cents per sack of rough rice; 50 cents per bale of cotton; 7½ cents per ton of sugar cane, grown in the district and removed therefrom before being converted into sugar; 4 cents per 100 lbs. of seed cotton, grown in the district and removed therefrom; $100.00 per mile of main line of railroad.

The authorized bonded debt of the district is $1,000,000, of which $730,000 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $10,575,300 and $10,865,610, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district, the State and the United States, was approximately as follows, viz.:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District	3.13	0.14	591,188	$117,536.50
By the State	1.33	0.98	274,164	61,728.45
By the United States	3.86	6.24	715,204	130,435.92
Totals	8.32	7.36	1,580,556	$309,700.87

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district is as follows:

By the District, 72,042 cu. yds., amounting to....$11,116.08
By the State, 50,227 cu. yds., amounting to.... 7,986.09

Totals .....122,269 cu. yds., amounting to....$19,102.17

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its lines of levee generally, $83,592.12, and in protection work during high water, $11,080.40.

The condition of the line of levee in this district, with regard to grade and section, is, at this time, about as shown in the following statement, viz.:

PARISH	2 to 3 Feet above High Water	3 to 4 Feet above High Water	4 to 5 Feet above High Water	Total Miles In Parish	Cubic Yards required to conform to Mississippi River Commission Provisional Grade.
	Miles	Miles	Miles		
East Baton Rouge	0.1	2.3	11.6	14.0	100,000
Iberville	------	0.6	26.1	26.7	25,000
Ascension	0.2	0.1	18.8	19.1	22,500
St. James	------	------	23.3	23.3	----------
St. John	2.3	------	12.4	14.7	112,000
St. Charles	1.2	------	15.3	16.5	50,000
Jefferson	0.3	7.9	3.3	11.5	84,500
Totals	4.1	10.9	110.8	125.8	394,000
Percentages	3%	9%	88%		

Provisional Grade recommended by the Mississippi River Commission: 4.6 at Baton Rouge, and 4.0 at upper line of Orleans Parish, above high water.

From the above table it will be seen that the condition of the levee line in this district compares favorably with that of any other district in the State, and had it not been for the great amount of caving banks which followed the fall of the high water of 1908, the entire district would at this time be up to standard grade.

But as the high water of 1908 receded, which was remarkable for its long period of duration, having covered the batture of the entire district for more than five continuous months,

the caving in the district was unprecedented in the history of any previous year, and the levee line was breached in many places, viz.: at Ben Hur, Chatsworth, Belle Helene, Bagatelle, Bourbon, Longview, Golden Grove, Cornland and Gypsy.

To meet these emergencies strained the resources of the district to their limits, and consumed every dollar of its revenues, together with the allotments of the State and the United States. For this reason, no enlargement work was undertaken during the season of 1908. Again, during the season of 1909, for the same reason, the necessity for new levees precluded any enlargement being done.

The new levees built or contracted for during the season of 1909 are Ophelia, Southwood, Landry, Gem, Darrowville, Hermitage, Gypsy, Boisblanc and Southport. Of these, two, Gem and Boisblanc, are United States contracts, and the balance are district and State contracts. All of the State and district contracts are completed except Gypsy, not yet begun, and Landry, under construction. The United States contract at Gem is under way, but that at Boisblanc has not yet been begun.

Conditions in this district, at this time, point to the necessity, in the early future, for the contsruction of new levees at Grenada-Manchac, Ophelia, Hundred Mile Plantation and Hardtimes, in Iberville Parish; Southwood and Hermitage, in Ascension Parish; Reserve and Cornland, in St. John Parish, and at Deckbar's, in Jefferson Parish, aggregating about 1,350,000 cubic yards on safe locations.

All repairs, including restoration of wave wash (26 miles), weed cutting and drainage of borrow pits, was completed for the season of 1909. Drainage, or outlet and inlet, canals were cut at Arlington, upper and lower ends, and Southwood, upper and lower ends.

6. *The Lafourche Basin Levee District:* Composed of all the alluvial lands, except the parish of Orleans, lying between Bayou Lafourche, the Mississippi River and the Gulf of Mexico, and those parts of the parishes of Ascension, St. James, St. John, St. Charles, Jefferson and Plaquemines, lying on the right or west bank of the Mississippi River, from Donaldsonville to the lower line of Riceland Plantation, and of the parishes of Ascension, Assumption and Lafourche, lying on the left bank of Bayou Lafourche, from Donaldsonville to "Chere Ami Canal."

The lengths of the levee lines in this district are: On the Mississippi River, 119.8 miles; and on Bayou Lafourche, 74.1 miles. As in the case of the Atchafalaya Basin Levee District, the Lafourche Levee District is no longer directly subject to overflow from Bayou Lafourche, rendering a levee line along its banks unnecessary, so long as the dam at the head of the bayou, at Donaldsonville, is maintained, or locks be substituted therefor.

The district is included in the United States "Lafourche District," and part of the United States "Barataria District."

The affairs of the district are conducted by a Board of Commissioners, composed of nine members, one from each parish or part of parish in the district, and one in the district at large, appointed on the recommendation of the railroads of said district.

The domicile of the district is at Gretna, Jefferson Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: 2½ cents per acre on all land; $100.00 per mile on all standard guage line of railroad, operated by steam, excepting railroads the total length of which in the State is less than 100 miles, upon which the rate shall be $50 per mile: 10 cents per barrel of sugar; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $14,887,554 and $15,087,445, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district, the State and the United States is as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District	4.57	8.74	856,884	$267,323.32
By the State	2.92	0.33	302,340	64,541.06
By the United States	1.97	3.23	202,309	28,235.67
Totals	9.46	12.30	1,361,533	$360,100.05

The amount and cost of the levee work done in the district, during the past two years, by the district, the State and the United States, is as follows:

By the State, 7,258 cubic yards, amounting to $1,807.24.

In addition to the above, the district, during the same period, expended in minor repairs and for the care, preservation and protection of its line of levee generally $94,131.40, and in protection work during high water, $21,718.96.

The condition of the line of levee in this district, with regard to grade and section, is, at this time, about as shown in the following statement, viz.:

PARISH	0 to 1 Foot above High Water	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	4 to 5 Feet above High Water	Total Miles in Parish	Cubic Yards required to conform to Mississippi River Commission Provisional Grade.
	Miles	Miles	Miles	Miles	Miles		
Ascension	------	------	0.9	0.1	6.4	7.4	44,000
St. James	------	------	0.1	0.1	21.5	21.7	8,500
St. John	------	------	0.5	0.1	14.3	14.9	20,500
St. Charles	------	------	2.4	8.1	7.4	17.9	23,400
Jefferson	------	1.2	2.1	11.8	4.9	20.0	97,000
Plaquemines	1.1	2.3	5.8	28.7	------	37.9	327,100
Totals	1.1 1%	3.5 3%	11.8 10%	48.9 41%	54.5 45%	119.8	520,500

Provisional Grade recommended by Mississippi River Commission: 4.2 at Donaldsonville, 4.0 at Orleans and 3.5 at Riceland, above high water.

As will be seen by reference to the tabulated statement of work done during the past two years, a large amount of levee work has been performed within the limits of this district from April 20, 1908, to April 20, 1910.

As a result of this work, together with all that which has preceded it, the levee lines of the district are being gradually brought to the standard grade and section designed for them, the yardage still required, at this time, to adjust them to Mississippi River Commission Provisional Grade, and corresponding section, being only about 520,500 cubic yards.

While the high water of 1908 did not establish new records along any parts of the district, it was notable for the length of time during which it remained against its embankments, that is, from the latter part of February to the middle of July. This prolonged period of high water resulted in considerable caving, following the subsidence of the water, and necessitated the construction of new levees in quite a number of localities.

From present indications, it would seem probable that new levees may be required, within the near future, at the following localities in the district, viz.: A. Bend and Cofield, in Ascension Parish; Oak Alley Store, in St. James; Waguespack and Haydel, in St. John; Hahnville Court House, in St. Charles; Cedar Grove, Avondale, Fairfield, Company Canal and Gretna Front, in Jefferson; and Myrtle Grove, Wood Park, Junior and West Pointe a la Hache, in Plaquemines Parish, aggregating some 600,000 cubic yards.

On October 26, 1909, a cave occurred at the Gretna Front, which carried away a part of the controlling line of public levee. In view of the congested condition of the locality, resulting from the many improvements, in the shape of manufactures, residences, steam and street railway tracks, pavements, etc., etc., and the short space of time intervening between the occurrence of the cave and the usual period of high water, it was not deemed practicable to construct a new levee on a safe location. In order, however, to protect the locality and the district in general, it was determined to build, as a temporary expedient, a "Box Levee." This "Box Levee" was duly undertaken, and completed within sixty days of signing the contract, and is now serving the purposes for which it was intended.

In view of the great magnitude and value of the property which would be affected by the construction of a new levee at this locality, represented as amounting to $4,000,000, it is the opinion of the Board of State Engineers, that the situation along this part of the river appeals strongly for bank protection work by the United States Government.

The general condition and appearance of the levee lines of the district may be said to be good. The restoration of wave-wash, drainage of borrow pits, minor repairs to the levees, weed cutting, etc., has been fairly well done in some of the parishes of the district, this class of work being generally executed under the direct supervision of the local Levee Commissioner.

The State laws relative to the care and preservation of the levee lines have been fairly well enforced. It may not be amiss, however, to herein lay stress upon the necessity of being especially active in the enforcement of the State laws designed to safeguard the levees against abuse in connection with the siphoning or pumping of water from the river, over the levees, and the flooding of fields, for rice culture. Act 98 of 1892 makes it unlawful to flood any land, bordering on the Mississippi River, within 500 feet of the land edge of any public levee; this same act also provides that the discharge end of siphons must be located at a distance of not less than twenty-seven feet from the land edge base of any public levee. These laws, if properly enforced, provide ample protection for the levee lines, and the property owners, who are so vitally interested in the maintenance of the levees, should co-operate with the authorities in enforcing them.

7. *The Orleans Levee District:* In response to the request of the Board of State Engineers, for information in regard to the operations of the Orleans Levee District, during the past two years, a report, under date of April 15, 1910, was received from the Hon. Jules C. Koenig, President of the Board of Commissioners of the Orleans Levee District, which is so complete and comprehensive that the Board of State Engineers is pleased to reproduce it in full, as follows, viz.:

"State of Louisiana.
"Office The Board of Levee Commissioners
of the Orleans Levee District,
Room No. 15, Masonic Temple,
"New Orleans, La., April 15, 1910.

"Major F. M. Kerr, Chief State Engineer, City:

"Sir—The Board of Levee Commissioners of the Orleans Levee District has the honor to submit for your information the following report, with accompanying appendices, covering the period from April 15, 1908, to April 15, 1910:

DUTIES AND PERSONNEL OF THE BOARD.

"The Board of Levee Commissioners of the Orleans Levee District was created by Act 93 of the General Assembly of the State of Louisiana, approved July 7, 1890. Under the provisions of this act, the parish of Orleans was 'formed into a public levee district,' and a Board of Levee Commissioners composed of nine persons possessing all the requisites of a qualified elector in said parish, administer the affairs of the district, seven of whom are appointed by the Governor of the State from the several municipal districts of the city, and two (the Mayor and the Commissioner of Public Works of the city of New Orleans) being ex-officio members of the board.

"The said Board of Levee Commissioners is charged with the construction and repairs and invested with the control and maintenance of all levees in the said Orleans district, whether on river, lake, canal or elsewhere. The said Board of Levee Commissioners, as to location, construction and repairs of all levees on the river front of said district, shall first have the approval in writing of the State Board of Engineers.

LENGTH OF LEVEE LINES.

"The public levee lines of the district lie on both sides of the Mississippi River, that on the left or east bank being 12.23 miles, and that on the right or west bank 13.63 miles in length. The district also maintains lines of 'Rear Protection Levee' aggregating about 43.8 miles in length.

DOMICILE.

"The domicile of the board is in the city of New Orleans; at present it occupies offices Nos. 14 and 15 Masonic Temple,

No. 337 St. Charles street, but in the near future it will be removed to a suite of rooms on the second floor of the 'New Court House Building,' at the corner of Royal and St. Louis streets.

GRADES OF LEVEES.

"Of the 12.23 miles of levee on the left, or east, bank, 2.07 miles, or 17 per cent, of the line is 4 to 5 feet above the highest water of record, 1903; 2.9 miles, or 24 per cent, from 3 to 4 feet; 4 miles, or 33 per cent, from 2 to 3 feet; 1.1 miles, or 9 per cent, from 1 to 2 feet; 2.1 miles, or 16½ per cent, from 0 to 1 foot; .06 miles, or ½ of 1 per cent, below high water.

"Of the 13.63 miles on the right, or west, bank, 1.9 miles, or 14 per cent, of the line is 4 to 5 feet above the highest water of record (1903); .96 miles, or 7 per cent, is 3 to 4 feet; 5.22 miles, or 38 per cent, is 2 to 3 feet; 4.85 miles, or 36 per cent, is 1 to 2 feet; 0.7 miles, or 5 per cent, is 0 to 1 foot.

"In consequence of the low grades and other defects of a more or less serious character, here and there, the Orleans Levee District, in response to public demand, some three years ago inaugurated a movement to improve and maintain as rapidly as possible its levee lines along the Mississippi River to the grades and sections as recommended at that time by the Board of State Engineers.

FORMULA OF THE BOARD OF STATE ENGINEERS.

"In general terms, this formula proposed an embankment of earth to be built, and maintained to a grade not less than five (5) feet above the high water of 1903, with a crown not less than fifty feet wide, river side slope not steeper than three horizontal to one vertical, and land side slope not steeper than ten horizontal to one vertical; the flattening of slopes and widening of crown beyond these limits to be governed by the special requirements of what is known as the 'Commercial Front' on the left or east bank of the river. On the right or west bank of the river the levees to be raised and enlarged to a grade five (5) feet above the high water of 1903, with crown ten feet wide; river side slope not steeper than three horizontal to one vertical, and land side slope not steeper than four horizontal to one vertical.

"Vide Exhibits 'C-1' and 'C-2' following.

PROVISION OF FUNDS.

"In order to carry out this project, which necessarily involved a large outlay of money for the payment of property appropriated. During the period April 15, 1908, to April 15, 1910, there has been a total disbursement of $2,424,056.15, made up as follows:

APPROPIATION FOR REAL ESTATE.

Third District	$ 435,791.13
Fourth District	589,119.67
Fifth District, received	325.00
Sixth District	83,299.76
Seventh District	470,019.35
Totals	$1,577,904.91

"The above includes $28.063.64 certificates of indebtedness outstanding and charged to the Third District.

Amount paid contractors, including expenses closing Beka and Bayou St. John crevasses	$ 630,030.09
Loss of interest paid Interstate Bank account transfer of deposit	7,714.20
Interest on loans prior to bond issue, April, 1908, to February, 1909	25,116.56
Emergency high water	936.17
General maintenance and repair of levees, labor, material, salaries of employees and incidental expenses	182,354.22
	$2,424,056.15

"In addition, amount paid for appropriation of property June, 1907, to April 13, 1908, $416,926.62, part of which was paid in cash and remainder in certificates bearing 5 per cent interest, which have been redeemed; so far averaging, as shown by the work undertaken since the inception of the project, nearly three times as much as the cost of the levee work itself.

"The district appealed to the General Assembly of the State of Louisiana in 1908, and succeeded in having its previous bonded indebtedness of $500,000 increased to $3,000,000; this amount is outstanding. The other sources of revenue are derived from the district tax authorized and permitted by law, which is an annual ad valorem tax of one mill on the dollar on all property subject to taxation in the district, and the annual allotment by the State of $10,000 from the General Engineer Fund. The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $228,745,936 and $226,581,922 respectively.

SUMMARY OF WORK DONE IN THE PAST TWO YEARS.

"From the tabulated statements in Exhibits 'A-1' and 'A-2' (published in Appendix 'A,' Report of the Board of State Engineers, page ....) it will be seen that expenditures for levee purposes have during the past two years been as follows:

Earthwork:	
34,017 linear feet of new levee and 19,142 linear feet of enlargement, containing 919,672 cubic yards, and costing	$496,288.80
Revetment:	
15,366 linear feet of revetment, amounting to 752,744 feet, B. M., and costing	41,192.09
General maintenance and repairs of levees, labor and material, and other expenses incidental to operation of Board, including salaries of employees	216,121.15
Total expenditure, as above	$753,602.04

In addition to the foregoing are the following special items:

Pulling piles in the Third District for United States bank protection work	$ 26,591.60
Pumping deposit from foreshores	315.00
Closing Beka crevasse	44,483.27
Closing Bayou St. John crevasse	544.82
Extra claims allowed on contracts	20,614.51
	$92,549.20

Making a total expenditure of $846,151.24.

FUTURE WORK.

"In addition to the completion of the Carrollton Reach Levee and Revetment under contract to the Hercules Company, Ltd., with sixty per cent of the work done up to date, it is the intention of the board as soon as the appropriation of properties is finally settled, and the areas cleaned and cleared of buildings, foundations, etc., to advertise for the construction of a new levee between Lafayette avenue and Louisia street, Third District. 2,600 linear feet in length, approximating 170,000 cubic yards of earth, at a probable cost of $150,000.

"Property values settled and paid for within the area to be occupied by this levee so far amount to in cash.... $75,869.63
In certificates bearing 5 per cent interest..... 28,063.64

Total up to date.....$103,933.27

The remaining property holders have tendered $712,629.53 for their belongings, which if accepted by the board will make the cost of this project nearly a million dollars.

NEW PROJECTS.

"Surveys are now completed, and locations subject to the approval of the Board of State Engineers have been made for the improvement of the present line of levees from Kentucky to Egania streets, and Egania street to Parish Line, in the Third District; 7,843 linear feet in length, approximately 500,000 cubic yards of earth, at a probable cost of $450,000, with property to be appropriated valued at $650,000, or a total expenditure of over a million dollars for this project. The above estimate would be very materially reduced if the properties were at once appropriated, and the work advertised on a long time contract. The above projects would practically complete the levee line in the Third District.

"The improvement of the levees from the upper line of Audubon Park, the present terminus of the Carrollton Reach and Revetment contract, to Napoleon Avenue, calls for upward of 337,000 cubic yards of earth, distributed as follows:

Upper line Audubon Park to Joseph Street.....107,000 cu. yds.
Joseph Street to Napoleon Avenue.....230,000 cu. yds.

and if undertaken this coming season, with the levee line fixed and determined on from Joseph Street to Napoleon Avenue, ahead of the erection of industrial plants which are now seeking this location, and before the building of wharves by the Board of Commissioners of the Port of New Orleans, the price per cubic yard for actual construction, as well as the property values appropriated, would be largely reduced.

"With the construction of this stretch of levee the line of improved levee from the upper end of the parish to Napoleon Avenue, over four miles, will be practically completed to standard grade. From Napoleon Avenue to Louisiana Avenue this area is occupied by the Stuyvesant Docks, the property of the Illinois Central R. R. This yard, as well as all railroad terminals on the commercial front, should be raised to the standard grade and section.

"In Exhibits 'C-1' and 'C-2' will be found detailed statements showing approximate elevation of levees above highest water in the Orleans Levee District, on both banks of the Mississippi River; also approximate quantities of earthwork required to place said line to the Board of State Engineers' grade and sections. A summary of which will appear on the surface, a gigantic undertaking, and involving a very large

outlay of money, but if we stop to analyze and compare what has been accomplished in the past two years, we find that we are in a better position to-day to approximate the final cost of this undertaking than we were in its incipiency. Notwithstanding the difficulties of the problem, we recognize the salient features in the determining of the estimate to be as follows:

"First, that the appropriation of properties are nearly three times as much as the cost of the levee work.

"Second, that the output of earthwork in the most favorable of seasons has been less than 500,000 cubic yards per season.

"Third, that the cost of the levee work has been very much reduced in the past year by the use of mechanical devices.

"The financiering of the project is not so difficult of solution. Under the provisions of the Constitution of 1879, and that power is embodied in the Constitution of 1898, the Board of Commissioners of the Orleans Levee District can levy an additional tax up to five mills on the dollar, and this limit of five mills can be doubled and made ten mills on the dollar, by submitting same to a vote of the people; whilst the Constitution gives this board the power to raise taxation, however, it requires legislative action to enforce the mandatory.

BANK PROTECTION.

"It has been repeatedly declared that the Orleans Levee District is of record as announcing that if the National Government will undertake the task of bank protection and thereby fix the harbor lines within the limits of the district, the district will construct and maintain all the levee lines required.

"Since the inauguration of this project by the Orleans Levee District, the United States Government has expended in revetments of the banks, mattress work, some $281,257.43, distributed as follows:

Carrollton Bend	$ 96,528.71
Third District	184,728.72
Total	$281,257.43

"The above work is not yet completed. The outlook for its early renewal, and similar work within the limits of the district is at this time very promising.

STAGES OF THE RIVER.

1908.

"The river began rising at New Orleans on February 14, and kept steadily climbing, covering all high battures by the 15th of March, at a stage of 16.5 on the Canal street gauge; during the month of April it reached 18 feet, and stood slightly above on the Canal street gauge. During the month of May it stood nearly 19 feet on the Canal street gauge, and during the month of June practically 20 feet on the Canal street gauge.

"On Saturday, June 6, at 9:30 o'clock a. m., a telephone message was received, stating that a break had occurred at the lower Beka line in the Fifth District, about twelve miles below Algiers Point. It was closed on June 21, 1908, without inflicting any material damage, except in the immediate locality. This stretch of levee for a distance of about one and a half miles had long been in bad condition, due to crayfish and muskrats that had burrowed through it, and at each high water bad holes would develop, causing incipient breaks, which had to be closed at considerable expense; the levee line was in an isolated position and far back from the river. It has since been replaced by a new levee to standard grade and section. The river began receding in the early part of July, and rapidly after the 20th of July, and by August work was resumed on outstanding contracts interrupted by high water.

1909.

"In 1909 the highest gauge reading was 17.9 on the Canal street gauge, which was on April 2, 1909; the river then declined to 14.5 on April 28, 1909, and then began to rise again, reaching 17.0 feet on the Canal street gauge on June 3, 1909, and then declined slowly in June and July, and work was begun on August 5, 1909, on the Carrollton Reach and Revetment Levee.

1910.

"So far river conditions have not interfered with work under contract. The highest gauge reading, 14.4, on the Canal street gauge was reached March 29, 1910, and since then the river has been steadily declining; whilst the situation to-day is very promising for no high water, if heavy and general rains would occur throughout the basin of the Mississippi Valley we would get a flood stage and a late river.

"Yours truly, "JULES C. KOENIG."

Exhibit C—1.

"State of Louisiana,
Office Board of Commissioners,
Orleans Levee District,
New Orleans, La., April 15, 1910.

"Statement showing approximate elevation of levees, above highest water in the Orleans Levee District, left or east bank of the Mississippi River; also, approximate quantities of earthwork required to place said line to the Board of State Engineer's Grade, which is 5 feet above the highest water (1903), with crown 50 feet wide and slopes 3 to 1 river side and 10 to 1 land side. Quantities also given for a levee of same grades and slopes with crown 10 feet.

Name of Levee	Linear Feet	Feet Above H. W. 1903	Crown 50 Feet Cub. Yds.	Crown 10 Feet Cub. Yds.	Remarks
Upper Protection Levee to upper line Audubon Park.	10,382	4 to 5	380,000	180,000	Under construction for 10 ft. crown, 237,000 cubic yards having been placed.
Upper line Audubon Park to Joseph Street	6,660	3 to 4	227,000	107,000	
Joseph St. to Napoleon Ave	5,900	4	339,000	230,000	
Napoleon Ave. to Louisiana Ave	4,570	1	70,000	37,000	
Louisiana Ave. to St. Mary St.	6,529	3	105,000		
St. Mary St. to Canal St.	9,000	0.5 below to 2.5 above	165,000	95,000	
Canal St. to Barracks St.	4,790	1.5 to 2.5 above	132,000	198,000	
Barracks St. to Lafayette Ave	1,680	0.0 to 2.5 above	80,000	47,000	
Lafayette Ave. to Louisa St.	2,600	0.3 below to 3.0 above	170,000	91,000	
Louisa St. to Kentucky St.	3,816	5			Completed.
Kentucky St. to Egania St.	3,580	2.5 to 3.0 above	233,000	125,000	
Egania St. to Parish line	4,263	3 to 5	263,000	150,000	
Totals	63,770		2,164,000	1,160,000	

"EXHIBIT C—2.

STATE OF LOUISIANA,
OFFICE BOARD OF LEVEE COMMISSIONERS,
ORLEANS LEVEE DISTRICT,
NEW ORLEANS, LA., April 15, 1910.

"Statement showing approximate elevation of levees above highest water in the Orleans Levee District, right or west bank; also approximate quantity of earthwork required to place said line to the Board of State Engineers' Grade, which is 5 feet above the highest water (1903), with crown 10 feet wide and slopes 3 and 4 to 1.

Name of Levee Station to Station	Linear Feet	Feet above H. W. 1903	Cubic Yards	Remarks
Parish line to Newton St.				
0 to 21	2,100	2	34,400	
Newton St. to Alix St.				
21 to 34+25	1,325	2	18,800	
Alix St. to Pelican Ave.				
34+25 to 38+45	420	3	2,500	
Pelican Ave. to Morgan Ave.				
38+45 to 51+16	1,271	2	11,500	
Morgan Ave. to Bermuda St.				
51+16 to 58+77	761	3	4,700	
Bermuda St. to Algiers Saw Mill.				
58+77 to 65+10	633	2	5,000	
Algiers Saw Mill				
65+10 to 68+75	365	½	4,000	
Southern Pacific R. R. Yards to Algiers Saw Mill				
68+75 to 75+35	660	3	3,800	
Southern Pacific R. R. Yards				
75+35 to 111+80	3,645	½	41,000	
Southern Pacific R. R. Yards to U. S. Naval Station				
111+80 to 119+40	760	2	7,400	
U. S. Naval Station				
119+40 to 156+90	3,750	4		
U. S. Naval Station to McLellandville				
156+90 to 175	1,810	2	20,300	
McLellandville				
175 to 192	1,700	3	22,000	
Convent Place to Esnard Place				
192 to 342	5,000	2½	55,400	
Aurora				
242 to 309+83	6,783	3	63,800	
Cut-Off				
309+83 to 330	2,017	1½	21,800	
Orleans				
330 to 412+55	8,255	3	88,700	Caving bank, new levee will be required; 600,000 cu. yds.

Name of Levee Station to Station	Linear Feet	Feet above H. W. 1903	Cubic Yards	Remarks
Couret Place				
412+55 to 426+05.....	1,350	4	11,900	
Upper Stanton				
426+05 to 441+03.....	1,498	3	18,400	
Stanton				
441+03 to 489+56.....	4,853	1½	58,700	
Shamrock				
489+56 to 511+56.....	2,200	3	18,500	
Delacroix				
511+56 to 608+69.....	9,713	1½	115,200	
Lower Delacroix to Upper Beka..				
608+69 to 642+78.....	3,409	5	11,500	
Beka				
642+78 to 653+31.....	1,053	2	2,000	
Lower Beka New Levee.....				
653+31 to 719+63.....	6,632	5	19,900	
Totals	71,963		661,200	

8. *The Lake Borgne Basin Levee District:* Composed of the alluvial lands on the east bank of the Mississippi River below the City of New Orleans, situated in the Parish of St. Bernard, and in that part of Plaquemines Parish lying north of the lower line of Bohemia Plantation.

The district is included in the United States "Lake Borgne District."

The length of the levee line of this district, all fronting on the Mississippi River, is 47.9 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of three members, one from each parish in the district, and one representative of the New Orleans and Southern Railroad Company.

The domicile of the district is at New Orleans, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents on each and every acre of land within the limits of the district susceptible of cultivation; $60.00 per mile of railroad line; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 10 cents per barrel of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½

cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges produced in said district; 1½ cents per barrel of oysters gathered from the waters within the limits of the district.

The authorized bonded debt of the district, all of which is outstanding, is $100,000.00.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $2,908,550 and $3,881,254, respectively.

The amount and cost of the levee work done in this district, during the past two years, by the district, the State and the United States, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	1.75	0.75	175,940	$34,882.07
By the District	0.19	------	19,331	8,437.09
By the United States	0.13	0.66	22,074	6,695.40
Totals	2.07	1.41	217,345	$50,014.56

The condition of the line of levee in this district, with regard to grade and section, is, at this time, about as shown in the following statement, viz:

PARISH	0 to 1 foot above high water	1 to 2 feet above high water	2 to 3 feet above high water	3 to 4 feet above high water	Total miles in Parish	Cubic Yards required to conform to Mississippi River Commission Provisional Grade
	Miles	Miles	Miles	Miles		
St. Bernard	------	2.4	4.3	4.1	10.8	211,000
Plaquemines	3.0	8.1	11.0	15.0	37.1	615,800
Totals	3.0	10.5	15.3	19.1	47.9	826,800
Percentages	6%	22%	32%	40%		

Provisional Grade recommended by the Mississippi River Commission: 3.4 above high water 1903 at Jackson Barracks, and 3.0 above high water 1903 at Bohemia.

In this district, it is desired to call attention to conditions at Caernarvon, Scarsdale-Stella, Greenwood, Belair, Fairview and Monsecour or Poverty Point, where the necessity for new levees within another season, aggregating something more than 200,000 cubic yards, appears to be demanded.

As a whole, the condition of the levee line of the district may be said to be good. The season's repairs have all been completed and all leaks of last season cut out and the section refilled. Revetments have been built and repaired, wherever necessary and the entire line is at this time well revetted, wherever needed. All contracts have been completed, except Arnold Cosse New Levee, on which work was interrupted by the high water, leaving about 300 feet on the lower end to be finished. A wing, connecting with the controlling levee, was built at this place, and the whole work, including the wing, revetted.

The new levees built in this district during the season of 1908 are as follows: Cemetery, United States contract, revetted with concrete; Scarsdale, district contract; Fanny and Upper Bohemia New Levees and Lower Bohemia Enlargement, all State contracts.

Season of 1909: Poydras, State and district contract; Stella, Bel Air, E. Duplesis and Arnold Cosse New Levees, all State contracts. No enlargement work was undertaken by either the State or the district, the new levees necessary consuming all district funds and allotments.

9. *The Grand Prairie Levee District:* Composed of the alluvial lands subject to overflow on the left or east bank of the Mississippi River, embraced within the Parish of Plaquemines, from the lower line of Bohemia Plantation to the lower line of Baptiste Collette Gap.

The district is included in the United States "Lake Borgne District."

The length of the levee line in this district is 30.1 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Pointe a la Hache, Plaquemines Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: One dollar on every arpent front of land within the district facing the Mississippi River; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of esculents; 5 cents per barrel of oranges produced within the limits of the district, and 3 cents per barrel of oysters gathered from the waters of the district.

The authorized bonded debt of the district, all of which is outstanding, is $30,000.00.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $202,100 and $202,780, respectively.

The amount and cost of the levee work done in this district, during the past two years by the district, the State and the United States was as follows:

WORK DONE	Miles of		Cubic Yard of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	2.16	3.35	140,494	$41,820.73
By the District				1,500.00
By the United States	0.08	5.36	110,800	19,975.26
Totals	2.24	8.71	251,294	$63,295.99

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the State: 7,277 cubic yards, amounting to $1,018.05.

In addition to the foregoing, the district has expended in minor repairs and for the care, protection and preservation of its line of levees, $4,868.08, and in protection work during high water, $4,996.28.

The condition of the line of levee in this district, with regard to grade and section, is, at this time, about as shown in the following statement, viz:

PARISH	0 to 1 Foot above high water	1 to 2 Feet above high water	2 to 3 feet above high water	3 to 4 feet above high water	Total miles in Parish.	Cubic Yards required to conform to Mississippi River Commission Provisional Grade
	Miles	Miles	Miles	Miles	Miles	
Plaquemines	1.6	5.4	7.9	15.2	30.1	230,300
Percentages	5%	18%	27%	50%	------	----------

Provisional Grade recommended by Mississippi River Commission: 3.0 above high water 1903 at Bohemia, and 3.0 above high water 1907 at Fort St. Philip.

Where the lines of levee are, for well-known local causes, and well-known local reasons, generally located so near the river bank, it is difficult to definitely anticipate, any length of time in advance, the needs of localities where new levees may be called for from season to season, but a review of the situation in this district, at this time, shows that, at the following points, at least, provision should be made for new levees, viz: Cuselich Canal, Fort St. Philip, and Lucas Canal to Baptiste Collette Gap, requiring about 120,000 cubic yards of earthwork.

The levee line in this district, while not comparing favorably with that in either the Pontchartrain District or Lake Borgne District, has, nevertheless, been greatly improved during the past two years, and may be said to be, at this time, in fairly good condition.

The State contributed to this result by building new levees at Fox's, Waltzer, Pinaud's and at Baptiste Collette Gap, and by enlarging the levees from Cannon to Nestor, at Point Pleasant, and at New Canal; and the United States by enlarging the levees at Daisy, from Harris to Ponit Pleasant, and at Lower Point Pleasant.

The levee work at Baptiste Collette Gap, about three miles below the present lower end of the levee system in this district, was built by contributions by the State, the Levee District and the Oyster Commission of Louisiana, in the joint interest of protection from overflow, and the exclusion of fresh water from the oyster beds at and in the vicinity of the gap. The completion of the work was successfully accomplished in May, 1909. In January, 1910, however, a leak developed at the water line near the upper end of the dike, and it became necessary to strengthen that portion of the dike, by flattening the slopes and widening the crown, at and

for some little distance above and below the leak. This work was accomplished by machinery—dredge and barge—and, at this time, no further apprehension is felt for the safety of the work.

10. *The Buras Levee District:* Composed of the alluvial lands subject to overflow on the right or west bank of the Mississippi River, "in the Parish of Plaquemines, south of a line drawn from the lower line of Riceland Plantation to the limits of Harang Canal on Bayou Lafourche," extending to The Jump.

The district is included in the United States Barataria District.

The length of the levee line in this district is 34.1 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Buras, Parish of Plaquemines, Louisiana.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents per acre on all land susceptible of cultivation within the limits of the district; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 5 cents per ton of cane; 5 cents per sack of rough rice; 2½ cents per barrel of oysters; 2½ cents per bushel of esculents, and 5 cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $35,000.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $639,913 and $685,175, respectively.

The amount and cost of the levee work done in the district during the past two years, was as follows:

WORK DONE	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District	0.05	------	968	$ 193.60
By the State	1.13	2.42	92,656	38,766.04
Totals	1.18	2.42	93,624	$38,959.64

In addition to the foregoing, the district has expended in minor repairs, and for the care, protection and preservation of its line of levees, $20,767.58, and in protection work during high water, $7,849.21.

The condition of the line of levee in this district, with regard to grade and section, is, at this time, about as shown in the following statement, viz:

PARISH	0 to 1 Foot above high water	1 to 2 Feet above high water	2 to 3 feet above high water	3 to 4 feet above high water	Total miles in Parish.	Cubic Yards required to conform to Mississippi River Commission Provisional Grade
	Miles	Miles	Miles	Miles		
Plaquemines	7.9	11.5	5.8	8.9	34.1	429,500
Percentages	23%	34%	17%	26%	------	----------

The high water of 1908, while not as high as the highest of record, subjected the levee lines of the Buras Levee District to a severe test, remaining against the embankments from the latter part of February to the middle of July.

One small incipient break occurred on May 15, 1908, at Guesnard Tract, which was, however, promptly closed.

Since the last biennial report of the Board of State Engineers the levee lines of the district have been much improved in grade and section, the yardage still required at this time to adjust the lines to the Mississippi River Commission Provisional Grade and Section being approximately 429,500 cubic yards.

It is now recognized by both the United States and the State of Louisiana that projects for the construction of new levees in this district, and all other districts on the "Lower Coast," should carry with them provision for revetting the levees, in order to protect them against the wave-wash to which they would otherwise be subjected by passing steamers and the high winds from the Gulf.

From present indications, it would seem that new levees may be required in the district, within the near future, at the following named localities, viz: Orange Farm, Pelas to Buras Church, above and below U. S. Reservation (Fort Jackson), estimated to amount to about 150,000 cubic yards.

The general condition and appearance of the levee lines of the district is good. The restoration of wave-wash, drainage of

borrow pits, cutting and refilling of crayfish holes, weed cutting, etc., has been well done, being performed under the direction of the Local Levee Commissioner.

11. *The Plaquemines Parish East Bank Levee District:* Consists of all the territory contained within the Parish of Plaquemines, on the left or east bank of the Mississippi River, beginning at the upper line of Harlem Plantation and extending to the upper bank of Cuselich Canal, on the property of Peter Cuselich, below the Old Quarantine Station. It is entirely included within the limits of the Lake Borgne Basin Levee District and the Grand Prairie Levee District, so that all parts of it are also parts of another levee district. In this respect, as well as having been constituted "for the purpose of protecting the lands of said district from inundation from the waters of the Gulf of Mexico," the Plaquemines Parish East Bank Levee District differs from any of the levee districts of the State previously created.

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Pointe a la Hache, Parish of Plaquemines, Louisiana.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of "10 mills on the dollar of the assessed valuation" of the district. Should this tax prove inadequate, the district is further permitted "to levy annually a district tax not to exceed 50 mills on the dollar, on its assessed valuation," provided, "that the Said Board of Commissioners shall, in accordance with Article 239 of the Constitution of 1898, first submit, without any previous petition, the purpose for the proposed increased levy, and the length of time the same shall be levied, to a vote of the property taxpayers of said district," etc.

Forced Contributions: One dollar per acre on all lands in the district protected from inundation, lying between the Mississippi River and the Gulf Coast levees; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrrel of sugar; 35 cents per hogshead of sugar; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of vegetables and fruits other than oranges; 5 cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $135,000.00.

The assessed valuation of the district, on the tax rolls of 1908 and 1909, was $248,070 and $250,250, respectively.

The amount and cost of the levee work done in the district, during the past two years by the district and the State, was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	7.25	------	283,243	$37,361.80
By the State	0.69	------	13,031	2,143.60
Totals	7.94	------	296,274	39,505.40

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the district, 195,016 cubic yards, amounting to $23,514.39.

In addition to the foregoing, the district has expended $926.90 in weed cutting and minor repairs.

The levee line of this district is located as far back from the river as the stability of the marsh will permit, and varies from one-half to one mile distant from the river front. At convenient intervals, "Side Levees" are built to connect with the levee along the river front. These side levees have been built at Harlem at the upper end of the district; and at Bohemia, 10 miles, Nestor Canal, 15 miles, and Bayou Lamoque, 21 miles, below Harlem.

Of this system, some 37 miles in length, 26.8 miles, including side levees, have, up to date, been completed.

During the storm of September, 1909, the waters of the Gulf reached such a height as to sweep over this levee from a point about five miles above Pointe a la Hache to Harris Canal, a distance of 20 mlies. The storm level along this stretch rose to a height never before attained in the knowledge of the oldest inhabitants, and the levee covering this stretch was in many places washed away, and the entire stretch rendered practically useless by the numerous scattered gaps washed through it.

Proposals have, on two occasions, been invited for the restoration

of this storm-damaged portion of the system, but without result. Other efforts are now being made to secure a contract for this work.

12. *The Caddo Levee District:* All alluvial land, and all lands subject to or liable to overflow from the waters of Red River, or its tributaries, or its outlets, situated in the Parish of Caddo, not including such lands as occur within the corporate limits of the city of Shreveport, are embraced within the boundaries of this district.

The lengths of the levee lines in the upper and lower systems of this district, aggregate 86.2 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of seven members.

The domicile of the district is at Shreveport, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in this district, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $60 per mile of railroad; and 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000, of which $299,800 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1908 and 1909 was, $1,452,620 and $1,101,745, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district, and State was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	9.60	0.54	531,086	$77,439.29
By the State	5.46	------	419,661	62,868.44
Totals	15.06	0.54	950,747	$140,307.73

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the State, 50,666 cubic yards, amounting to $8,817.78.

In addition to the foregoing, the district has expended, in protection work during high water, $36,523.15.

The condition of the levee lines in this district may be said to be very good. During the high water of 1908 the caving along many parts of Red River, in this district, was unusually aggravated, and, besides the many emergency run-arounds thereby necessitated during the period of high water, it was afterwards necessary to rebuild about 16 per cent of the entire levee system in order to give the district anything like adequate protection. There seems to be little doubt but that caving along this part of Red River was more general and more serious than at any time since the completion of the system. Something like 13 miles of new levees had to be constructed before the succeeding high water, and, besides this, almost another 5 per cent of the balance of the line of levee was so nearly approached by caving, that provision will soon have to be made for its reconstruction as well. Fortunately, Red River has since been very low, and no additional caving has so far occurred to aggravate the situation.

Recent developments certainly also demonstrate that the time for doing something towards the prevention of cut-offs should no longer be delayed, or the protection of levees and property interests along the Caddo and Bossier fronts will get beyond any control afforded by the limited means now available for levee construction. These levee districts have burdened themselves with all the taxes it is possible to impose, and their annual revenues scarcely do more than pay the interest on their bonded indebtedness, and provide for the ordinary maintenance and repairs of their systems.

Any increase in the rate of caving, with its resultant losses of levee lines, will necessarily have to be met by either the State or the National Government, or perhaps both. The State has aided generously, as will be seen by reference to the tabulated statements of work done in Caddo and Bossier Parishes, but this cannot be said of the National Government, the latter having, in the past two years, in the matter of levee construction come to the rescue of the levee districts on Red River in only one instance, in Bossier Parish, when, after the high water of 1908, it undertook and built a new levee at Chalk Level.

The grade of the levees in this district required no readjustment after the high water of 1908, although the 1908 water appears to have, in some localities, exceeded that of any previous year.

In spite of the ceaseless energy and watchfulness of the levee authorities and riparian proprietors, two crevasses occurred in the system below Shreveport, one at Connell's and the other at Riverdale, the combined water of which inundated about 10 per cent of the area of the Caddo Levee District.

13. *The North Bossier Levee District:* All the alluvial lands subject to overflow from the waters of Red River or its tributaries of outlets, in the Parish of Bossier, bounded on the north by the Louisiana-Arkansas State line, on the east by the hills or uplands, on the south by the southern boundary of sections nine (9), ten (10), eleven (11), twelve (12) of township twenty-two north, range fourteen west, and on the west by Red River, are embraced within the boundaries of this district.

The control and management of the district is vested in a Board of Commissioners, consisting of five members.

The domicile of the district is at Plain Dealing, Bossier Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: A district levee tax of 10 mills on the dollar of the assessed valuation of all the property in the district subject to taxation for levee purposes.

Forced Contributions: Fifteen cents per acre on all land; $100 per mile of railroad lines; $1 per bale of cotton.

The authorized bonded debt of the district, none of which is yet outstanding, is $200,000.

The assessed valuation of the district on the tax rolls of 1908 and 1909, was $43,740 and $28,060.

No levee work has yet been undertaken in this district, by the district or the State, due to the fact that its Board of Commissioners is waiting upon the Long Prairie Levee Association of Arkansas to complete its system down to the State line. The North Bossier Levee District, owing to its location and geographical configuration, naturally forms the lower end of a levee district which should have its head at Long Prairie, in Arkansas, and its lower end at Posten Bayou, in Louisiana. But the fact that part of the dis-

trict was in one State and part in another, precluded the practicability of forming it into one levee district. This was especially so as that part in Louisiana (the lower end) is much the smaller. An understanding has, however, been reached to the effect that just as soon as the Arkansas District completes a continuous system from the highlands at Long Prairie down to the Louisiana line, the North Bossier Levee District will take up the work and continue the levee on down as far as its resources will permit.

An inspection on April 6, 1909, by Hon. N. W. Sentell, President of Board of Commissioners of the District, Chief State Engineer Frank M. Kerr, and Assistant State Engineer Gervais Lombard, revealed the fact that the Long Prairie levee system had not yet been completed to sufficient grade and section, nor upon safe enough locations, to warrant the North Bossier Levee District to begin construction.

14. *The Bossier Levee District:* All alluvial lands subject to or liable to overflow from the waters of Red River, or its tributaries or outlets, in the Parish of Bossier, south of the line dividing the north half from the south half of Township 20 North, are embraced within the boundaries of this district.

The length of the levee line in this district is 49 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of seven members.

The domicile of the district is at Bossier City, Bossier Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents on every acre of land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $400,000, of which $312,000 is, at this time, outstanding.

The assessed valuation of the district on the tax rolls of 1908 and 1909, was $1,597,207 and $1,518,395, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district and the State was as follows:

WORK DONE.	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District.....	6.85	------	363,814	$62,914.24
By the State.....	4.70	0.87	330,965	49,368.82
Totals	11.55	0.87	694,779	$112,283.06

In addition to the foregoing, the district has expended in minor repairs, and for the care, preservation and protection of its lines of levee $212.60, and in protection work during high water $37,500.

The condition of the lines of levee in this district, like those of the Caddo Levee District, is now very good, although, as was the case in the Caddo Levee District, the high water of 1908 did so much damage that at first the situation was quite discouraging.

During the high water of 1908 a serious crevasse, due to caving banks, occurred at the Grappe place, near Taylortown, which inundated about twenty per cent of the area of the district. Many other crevasses, at various points along the line were averted by the herculean efforts of the Board of Commissioners and inhabitants of the district.

When the high water of 1908 receded, ten per cent of the entire levee system in this district had to be rebuilt. All of this work has been completed, and at present there are no places which appear to require new levees in the very near future.

What was said concerning the effect of cut-offs upon the regimen of the river along the Caddo front, applies equally to the Bossier front.

The grade of the levees in this district required no readjustment following the high water of 1908, although the 1908 water probably exceeded in volume any previous high water.

15. *The Red River, Atchafalaya and Bayou Bœuf Levee District:* Under the act of incorporation of this district, all the territory in the Parishes of Rapides and Avoyelles, and in that part of the Parish of St. Landry, situated between the Atchafalaya River on the east, and Bayous Bœuf and Courtableau on the west and south is subject to its operations.

During the years 1890 and 1891, however, by due process of law, all that section of Rapides Parish, above Alexandria, bounded by Bayous Rapides and Jean de Jean and Red River, and all parts of the Parish of Avoyelles, situated on the left bank of Red River, as well as that part of the parish bounded by Bayou des Glaizes, the Atchafalaya and Red Rivers, and the public road running from David's Ferry, on Red River, to Bayou des Glaizes by way of Marksville, Mansura and the "Long Bridge," at Bout du Bayou, have been exempted from the operations of the act of incorporation of the district.

The lengths of the lines of levee in the three systems in this district aggregate 121.6 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of three members, one from each parish in the district.

The domicile of the district is at Alexandria, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: Ad valorem tax of 10 mills on the dollar on all lands and other property in the district subject to taxation for levee purposes.

Forced Contributions: Five cents per acre on all land in the district; $60.00 per mile of railroad.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.

The assessed valuation of the district, on the tax rolls of 1908 and 1900, was $7,802,970 and $8,020,180, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district and the State, was as follows:

WORK DONE.	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District.....	3.29	8.87	622,408	$110,515.19
By the State.....	1.13	4.93	205,881	53,282.14
Totals	4.42	13.80	828,289	$163,797.33

The amount and cost of the levee work still remaining, at this time, under existing contracts to be done in the district, is as follows:

38,761 cubic yards, amounting to $11,628.30.

In addition to the foregoing, the district has expended in minor repairs, and for the care, protection and preservation of its line of levees $2,033.70, and in protection work during high water $50,582.30.

The condition of the lines of levee in this district, especially on Red River, has been greatly improved since the high water of June and July, 1908. Unlike the Bossier and the Caddo Levee Districts, caving can be said to have been comparatively inconsequential.

No crevasses occurred in the district, unless the breaching in several places of the freshly constructed emergency embankments on Bayou Rapides, above the upper end of the levee system during the high water of 1908, could be so classified. The damage from these proved negligible. However, it was accepted as necessary to materially readjust the grade of the levees all the way from Alexandria to the Avoyelles Prairies at Moncla, on Red River, and from Melville to Latanier on the Atchafalaya. This will explain the unusual amount of enlargement, as compared with former periods, shown in the foregoing statement, as completed and under contract, as well as a still larger amount to be undertaken when means become available.

16. *The Red River and Bayou des Glaizes Levee and Drainage District:* All lands in the Parish of Avoyelles, situated between Red River, the Atchafalaya River, Bayou des Glaizes and the public road running from David's Ferry or Moncla's Ferry, on Red River, to Bayou des Glaizes, by way of Marksville, Mansura and the "Long Bridge" at Bout du Bayou, subject to overflow are included in this district.

The length of the levee line in this district is, at this time, 23 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of three members.

The domicile of the district is at Marksville, Avoyelles Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district, are as follows, viz.:

Tax: Ad valorem tax of ten mills on the dollar upon all of the property in the district subject to taxation for levee and drainage purposes.

Forced Contributions: Five (5) cents per acre on all land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000, all of which is, at this time, outstanding.

The assessed valuation of the district on the tax rolls of 1908 and 1909, was $512,640 and $584,200, respectively.

The amount and cost of the levee work done in the district during the past two years was as follows, viz.:

WORK DONE.	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District.....	3.08	.....	338,271	$47,878.58
By the State.....	0.66	4.98	102,280	12,463.33
Totals	3.74	4.98	440,551	$60,341.91

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the district, 350,000 cubic yards, amounting to $87,500.

In addition to the foregoing, the district has expended in minor repairs and for the care, protection and preservation of its lines of levees, and in protection work during high water, quite a sum, the exact figures for which are not at this time at hand.

The condition of the line of levee in this district, as far as completed, is good. The system has been completed to a point 23 miles below its head, and an extension of four miles down stream has only recently been started.

The high water of 1908 exceeded all previous records at the head of the system—David's or Moncla's Ferry—reaching 5.5 feet higher than that of 1892, but at the lower end of the levee line the high water record was not reached, by an appreciable margin.

So a readjustment of grades was necessary from the upper end down for seven or eight miles.

Caving opposite Ben Ruth Lake, four miles below Moncla, has nearly reached the levee, and as a new levee at that point would necessarily have to be constructed through a low cypress lake, entailing unusual difficulties, it was hoped that when it was shown that this bend could be revetted for less than it would cost to build the new levee, and that the present levee on high ground was smaller and safer if protected, that the National Government might be induced to undertake bank protection work. So far this hope has not been fulfilled, and a serious condition confronts the district.

17. *The Saline Levee and Drainage District:* All the territory in Avoyelles Parish, consisting of the alluvial lands subject to overflow within the following limits, is embraced within the district, to-wit: Beginning at Cassandria on the line between Sections 44 and 50, Township 3 North, Range 3 East, thence down Red River to Saline Bayou, thence following Saline Bayou, Saline Lake and Horse Pen Creek to line between Sections 17 and 18, Township 4 North, Range 3 East, thence south to the Point Maigre hills, and following the east edge of said hills to the point of beginning.

The length of the line of levee in this district, at this time, is 10.3 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of three members.

The domicile of the district is at Marksville, Avoyelles Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz.:

Tax: Ad valorem tax of 10 mills on the dollar upon all the property in the district subject to taxation for levee and drainage purposes.

Forced Contributions: Five cents per acre on all land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000, of which $100,000 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1908 and 1909 was $91,240 and $112,150, respectively.

The amount and cost of the levee work done in the district during the past two years was as follows:

WORK DONE.	Miles of New Levee Built	Miles of Levee Raised and Enlarged	Cubic Yards of Earthwork	COST
By the District.....	0.65	------	44,032	$10,662.76
By the State.....	1.60	------	99,930	16,343.14
Totals	2.25	------	143,962	$27,005.90

The condition of the line of levee in this district has been somewhat improved since the high water of 1908 by the closure of the crevasses at Experiment and at Clark's place, and increasing the grade of the levees about one and a half feet. The district capped the levee nearly all the way, as practically the whole line proved to be too low. The system being a short one, and being breached in two places caused the overflow of practically the entire district in 1908. The material used in capping was secured from the land side of the road, in the form of a sipe ditch.

Bayou Lafourche.

During the past two years, the joint organization of the Atchafalaya Basin and Lafourche Levee Districts, charged by law with carrying out certain projects for the improvement of Bayou Lafourche, has confined its operations to such dredging as was demanded to maintain a suitable channel for navigation by such craft as now ply upon that stream, to guarding against congestion by the water hyacinth, and to the establishing of fresh water connection with Lake Verret.

The project first considered to connect the canal dug by Drainage District No. 1 of Assumption Parish and Bayou Lafourche is practically completed. It develops, however, that this drainage canal, as completed by Drainage District No. 1 of Assumption Parish, does not in its present condition effect the connection with Lake Verret anticipated or required to induce the flow of fresh water from the lake into Bayou Lafourche sought for under the project. To accomplish this, it will be necessary to deepen and enlarge the drainage canal, involving some 50,000 cubic yards of excavation. This work the joint organization has now under consideration, and will very likely soon provide for.

In regard to the lock near the head of Bayou Lafourche, at Donaldsonville, revised plans and specifications for its construction, on less extensive and simpler lines than at first contemplated, are, at the request and at the expense of the Joint Organization, being prepared, by courtesy under the direction of Colonel Lansing H. Beach, Corps of Engineers, U. S. A.

In the meantime, the dam at the head of the bayou, authorized by the Secretary of War, pending the construction of a lock, the time for the removal of which has been twice extended, will no doubt be permitted to remain. However, it should not be overlooked that this is, under all the circumstances surrounding it, a great concession on the part of the National Government, and steps to adjust the situation to comprehensive and permanent lines should not be delayed any longer than can possibly be helped.

The project for closing Bayou Lafourche at its head, at Donaldsonville, by a lock or dam continues to gain favor, the benefits to the entire section of the State contiguous to Bayou Lafourche being manifold and convincing beyond the most sanguine expectations of its promoters.

New Basin Canal and Shell Road.

It has been the pleasant duty of the Board of State Engineers to serve the Board of Control of the New Basin Canal and Shell Road, in a number of important matters, during the past two years. Among these may particularly be mentioned, the pile jetty at the mouth of the canal, and the survey of the property lines of the Board of Control, reported as in contemplation at the date of the biennial report of the Board of State Engineers, from April 20, 1906, to April 20, 1908. These were conpleted during the past two years.

The creosoted pile jetty, located on the west side of the mouth of the canal, and extending 480 feet out into Lake Pontchartrain, was built upon the most approved plans, and of the best material of each class called for in the specifications.

Its direction was judiciously selected, its construction throughout carefully and conscientiously guarded, and it stands, to-day, a monument to the business acumen and zeal of the Board of Control in the performance of its duties and obligations to the public.

The survey of the property or right of way of the canal approached as nearly a permanent character as could well be obtained, the lines along both boundaries being marked by monuments, spaced not less than 1,000 feet apart. The monuments

consist of iron water pipes, three inches in diameter, and from 5 to 10 feet in length, according to elevation of surface of ground, set in concrete foundations, the latter lowered well into the ground and extending about one foot up around the pipes, in the form of a conical dome, with any part of the pipe extending above the latter painted in red.

In addition to the foregoing and other numerous improvements and repairs, annually imperative to the useful and fruitful maintenance of the canal, the Board of Contorl undertook, with the aid of the Orleans Levee District, to remodel the shell road along the west bank of the canal from the Metairie Cemetery to West End, two and three-quarters miles in length.

In other words, after an agreement between the Board of Control of the New Basin Canal and Shell Road, and the Orleans Levee District, to co-operate, had been reached, the latter promptly undertook to construct a levee and banquette along the west bank of the canal between the points named, the levee, with crown 6 feet wide and slopes of 3 and 3 to 1, to be 7 feet above mean Gulf level, and the banquette, with a crown 40 feet wide, and side slopes also of 3 to 1, to be 4 and 3 feet above mean Gulf level at its canal and swamp edges, respectively, the slopes of both levee and banquette to be planted with living roots of Bermuda grass, not more than 1.5 feet apart.

The levee and banquette has been completed by the Orleans Levee District, and the Board of Control of the New Basin Canal and Shell Roads has advanced well towards completion with the work required to construct the roadway upon the banquette.

The specifications for the construction of this roadway, 40 feet in width, call in general terms for the following, viz.: First, a thin sub-grade of river sand, just sufficient to cover all inequalities in grading the earthwork, and produce a flat, uniform surface; second, a flooring of plank (pecky cypress) 1 inch thick by from 8 to 12 inches wide laid on the sub-grade of river sand, at right angles to the axis of the roadway, placed close together, side by side, and end to end; third, two courses of clamshell screenings, 6 inches in thickness, sprinkled and thoroughly rolled during process of placing in position; fourth, one course of commercial clamshells (whole shells), 6 inches in thickness, also sprinkled and rolled as placed in position. The whole to be not less than fourteen inches in thickness when finally rolled and completed.

As finishing touches, to further please the eye, the Bermuda grass, with which the levee will be overgrown, will be cut and kept

close, to form a smooth surface of sward, and a box hedge will be trained along the opposite or swamp edge of the roadway.

There is little reason to doubt that this roadway, when completed, which will be within the course of the next thirty days or so, will rank in durability, service and elegance with most any of the very best in the country at large.

DRAINAGE.

The Board of State Engineers has, at this time, still no reason to depart from its previous views in regard to the systematic and comprehensive disposition of this problem, expressed in former reports, namely to vest it in a State Commission, with plenary powers, along lines similar to those governing levee location and construction.

Under existing laws, the Board of State Engineers is required to make such surveys, and render such engineer service as may be called for, through the Governor of the State, by regularly organized drainage districts, provided such districts defray all expenses incident to such surveys and engineering services.

During the past two years, application for either engineering advice or services, or, in instances, for both, for drainage projects, have been received from the following sources, viz.:

Mr. F. V. Mouton, Lafayette, La., in the interest of Bayou Queue de Tortue and Indian Bayou Drainage District.

Fifth Louisiana Levee District, with reference to proposition to superimpose a drainage district over the entire area included in the levee district.

Seventh Ward Drainage District of Vermillion Parish.

New River Drainage District of Ascension Parish.

Madison Parish Drainage District.

White and Cypress Bayou Drainage District of East Baton Rouge Parish.

Dr. S. M. Lyons, President Police Jury of Calcasieu Parish, in regard to drainage of Bayou Chene.

W. T. Bullard, of Midland, La., in the interest of improving drainage in Ward 5 of Acadia Parish.

Of the foregoing, investigations have been made, and reports, written or verbal, submitted on all, but surveys only on the following, viz.:

White and Cypress Bayou Drainage District.

New River Drainage District of Ascension Parish.

States Supreme Court. Sixteen such beacons were located and erected as early as July, 1909.

Then followed, first, conferences with the United States Lighthouse establishment for the purpose of obtaining authority to place buoys along the boundary line in accordance with the regulations of that department, and, next, a contract for supplying such materials, buoys, appendages, etc., paying such freight, transportation charges, labor, etc., and hiring such barges, tugs, etc., as in the discretion of the Chief State Engineer might be necessary.

The authority from the United States Lighthouse establishment was, after some little delay necessary to the consideration of the matter, by its officials, obtained, and the carrying out of the contract for materials, buoys, appendages, etc., is now under way, with a fair prospect of the entire proposition being consummated within the course of the next ten days.

In the interval between the erection of the beacons and obtaining authority from the United States Lighthouse establishment to proceed with the buoying, a violent storm visited the Gulf coast, resulting in the destruction and loss of two of the sixteen beacons established under the survey, and three others previously erected by the United States, in connection with its Lighthouse Service, upon which, in conjunction with the State beacons, the location of three of the points of departure in the courses is dependent.

These should be promptly re-established, two by the State and three by the United States. In regard to the latter, assurances have been received that two will, at all events, be re-established, and it may be possible to dispense with the third.

In regard to the expenses of the survey, location and erection of beacons, purchase of materials, etc., and the final placing of the buoys, it has from the beginning been evident that the appropriation of five thousand ($5.000.00) dollars would not suffice. Subsequent developments now demonstrate this to be a fact, as will be seen by the following statement, viz.:

Amount expended up to date as per itemized, detailed account on file at this department..	$3,563.37
Amount estimated as needed to complete project	5,000.00
Total	$8,563.37
Amount of appropriation	5,000.00
Apparent deficiency	$3,563.37

In this connection it would, of course, seem proper that the State of Mississippi should contribute its share of the expense of establishing this boundary line. That State, however, is in no way obligated to do so, and so far no such provision has been made, though, upon the representations of the Governor of this State, an appropriation was recommended by the Governor of Mississippi at the session of the Legislature of this year.

Little dependence can, however, be placed upon the outcome of this, and, therefore, it is earnestly urged that provision for the full additional amount required over and above the present appropriation, should without fail be made by the General Assembly of this State this year, as a contract for the completion of the balance of the work involved in marking this boundary has been entered into, the work in progress, and the amounts payable therefor will very shortly become due.

Act 262 of 1908, Relative to the Sale of Certain Lands Under the Waters of Lake Pontchartrain by the State of Louisiana to New Orleans Lake Shore Land Company.

Section 2 of Act 262 of 1908, recites: "Be it further enacted That the sale shall be made under the following terms and conditions:

"First: That the area included in this sale shall, within three months from the date of the promulgation of this act, be determined by a survey approved by the Board of State Engineers, and within thirty days from the date of such approval, the said company or its successors or assigns shall pay into the State Treasury the sum of one dollar and fifty cents per acre for all land included within such area, etc."

This act was approved and promulgated July 8, 1908, and a copy of the notes and map of a survey of the lake shore in front of the property of the New Orleans Lake Shore Land Company, made in conformity with Act 262 of 1908, was filed with the Board of State Enigneers October 3, 1908, by Mr. Warren B. Reed, Consulting Engineer of the New Orleans Lake Shore Land Company.

On October 5, 1908, after examining and checking the notes and map submitted, the following approval was recorded thereon by the Board of State Engineers, viz.:

"Office Board of State Engineers,
"New Orleans, La., October 5, 1908.

"The foregoing statement, marked 'A,' and made part of this approval, describing the survey required by Section 2, Act 262 of the General Assembly of the State of Louisiana, session of 1908, approved July 8, 1908, to determine the area included in the sale of certain land under the waters of Lake Pontchartrain, by the State of Louisiana, to the New Orleans Lake Shore Land Company, accompanying map delineating the said survey, is hereby approved.

(Signed.) THE BOARD OF STATE ENGINEERS,
Per FRANK M. KERR,
Chief State Engineer.

THE SEPARATION OF THE RED AND ATCHAFALAYA RIVERS FROM THE MISSISSIPPI RIVER.

As this subject is, at this time, so prominently before the public of the State, the Board of State Engineers has thought that some statement in regard to its views and opinions might be expected from it.

The Board, therefore, submits for consideration the following extracts from its recent reply to a letter of inquiry addressed to it by the Mississippi River Commission, under date of February 21, 1910, viz.:

* * * * * * * * *

"The points of view from which you expressed the desire to have the subject considered are, first, 'Effect on Riparian Property;' second, 'Effect on Levees,' and, third, 'Effect on Navigation.'

EFFECT ON RIPARIAN PROPERTY.

First. On the Mississippi River.

"The only effect on riparian property on the Mississippi River that might follow would appear to result from such increased grades and sections of levee lines as might be determined upon in the event that materially increased flood levels should be accepted as necessarily sequent to the consummation of the project; and, second, aggravated caving river banks, resulting from increase in velocity of current, due to higher flood levels; and third, greater sipage. There is, however, a ready and effective counteractant for the latter in drainage, the application of which almost everywhere in the State is just as much needed under existing high water conditions, no matter by what brought about.

"The first and second premises would demand additional appropriation of property and additional provision for construction and maintenance; and the third, additional preparation for and effort to effect proper drainage.

Second. On Red River (Lower Red River) and the Atchafalaya River.

"The effect on riparian properties along these streams would be eminently beneficial, from the fact that it would so lower flood levels as to not only very greatly simplify the problem and reduce the cost of levee construction and maintenance along both, but of drainage as well.

EFFECT ON LEVEES.

First. On the Mississippi River.

"Assuming a material increase in flood levels, it would call for an increase in and readjustment of grades, locally, and along certain stretches of the river above, as far up probably as Vidalia, La., and below, as far down as the Gulf of Mexico, particularly at and in the vicinity, and below New Orleans.

"This may, in turn, involve the addition of a considerable amount of earthwork, and some bank protection work, over and above estimates previously based upon premises that did not include consideration of the proposition to separate the Red and Atchafalaya Rivers from the Mississippi River.

Second. On Red River (Lower Red River) and the Atchafalaya River.

"The effect on the levees along these streams will, as in the case of the effect on riparian properties, be to greatly reduce their extent, simplify the problem of their construction and maintenance and reduce their cost.

EFFECT ON NAVIGATION.

"The only apparent adverse effect that could possibly result to navigation, or rather transportation by water, between certain sections of the State, from the separation of the Red and Atchafalaya Rivers from the Mississippi River, would appear to present itself in the fact that it would reduce the number of water connections

between these streams from two channels to one channel, that through the United States lock at Plaquemine, La.

"The history of the other connection, through Old River, is replete with chapter after chapter of difficulties and dangers to navigation, while there is little or no room for argument, all other things being equal, against the connection through the United States lock at Plaquemine as a more permanent, safer and more serviceable proposition at all times, under conditions of either high or low water in the Mississippi River.

"Some fear has, it is true, been expressed that the separation of the Red and Atchafalaya Rivers from the Mississippi River will have an injurious effect upon the depth of water, or water supply for the route through the Plaquemine Lock. Such a position appears to the Board of State Engineers as wholly untenable in that the waters of the streams composing that route, as well as all connecting bodies of water in that basin, are, during the greater portion of every year, controlled purely by tidal influences and such rainfall as usually occurs in the basin.

"High water in the Atchafalaya River, whether from Red River alone or the Mississippi River alone, or both combined, for a comparatively short period of each year simply raises these waters to some extent, greater or less, dependent upon the continuity and extension of the lines of levees on the Atchafalaya River.

"In fact, instead of producing any ill effects upon the waterways of this basin, from the point of view of navigation, the separation should prove a benefit, in excluding from them the sedimentary deposits escaping from the Mississippi River and reducing them to those from Red River, which river, as is well known, does not come out in flood annually, but only about one year in three as a general average.

"As to the direct physical effect in all three streams, from the point of view not only of navigation, but carrying capacity for the floods with which they may from time to time be charged, no one who knows anything at all about the control of sediment-bearing streams can possibly doubt the ultimate magnitude of the benefits to be derived.

"Little beyond what is herein already said in regard to the effect of the separation of the Red and Atchafalaya Rivers from the Mississippi River, from the point of view of riparian property, and of navigation, that might be of service to you, can well be added without going into exhaustive detail, which appears to the Board

of State Engineers, under the circumstances, unnecessary. But in regard to its effect, from the point of view of levees, it may be well to review some of the premises advanced, some of the history of high water and the conduct of the lines of public levees in the past, and some facts in regard to their condition at this time.

"Returning, then, to the question of the effect of the proposition on levees, it must be borne in mind that the admissions made by the Board of State Engineers are based upon the assumption that materially increased flood heights may follow.

"So, let us review some of the most prominent facts connected with increased flood heights in the Mississippi River in the last fifteen years.

"The Committee on Levees of your Commission, in 1895, after an elaborate study of the subject, and careful consideration of all the factors involved, reported, among other things, 'That with completed levees, a possible increase of flood heights above the highest heretofore known may occur at the following points, and to the following extent:

"Cairo, 2 feet; New Madrid, 3 feet; Memphis, 4 feet; Helena, 4 feet; White River, 6 feet; Vicksburg, 6 feet; Red River, 5 feet; Donaldsonville, 3 feet; Carrollton, 2 feet, and Fort Jackson, 1 foot.

"These anticipated increases in flood heights meant the following readings on the gauges at the stations named, viz.: Cairo, 54.17; New Madrid, 41.11; Memphis, 39.60; Helena, 52.10; White River, 56.40; Vicksburg, 55.05; Red River, 53.87; Donaldsonville, 33.60; Carrollton, 19.45, and Fort Jackson, 7.9. This estimate of the ultimate increase in flood heights, above the highest previously known at that time, predicated on lines of completed levees, was made when most of the large basins contiguous to the upper part of the valley were still but partially leveed, and, owing to the insufficiency and inadequateness of much of the general levee system below, at that time, crevasses were still frequent and extensive here and there in the Lower Valley.

"Let us, then, now compare the greatest flood heights which have since occurred at the same stations, with all these basins practically leveed and all crevasses closed—except the connection between the Mississippi and the Red and Atchafalaya Rivers.

"Cairo, 52.17, or still 2 feet lower than anticipated; New Madrid, 40.27, or 0.8 lower; Memphis, 40.30, 0.70 higher; White River, 50.70, or 2.70 lower; Vicksburg, 52.48, or 2.57 lower; Red River Landing, 50.20, or 3.67 lower; Donaldsonville, 32.75, or

0.85 lower; Carrollton 19.42, or 0.03 lower—or practically coinciding—and Fort Jackson, 8.3, or 0.40 higher. It will thus be seen that at ten stations, distributed over more than 1,000 miles of one of the largest rivers in the world, the history of whose floods has attracted the widest attention, this estimate, up to this date, with the levees practically completed, in so far as continuity and successfully opposing past floods, at least, is concerned, has been exceeded but at two stations, Memphis, Tenn., and Fort Jackson, La., by seven-tenths and four-tenths of a foot, respectively, and is still lower at all the other stations named by margins ranging all the way from about four-tenths of a foot to 3.67 feet—a very decided endorsement of the foresight of your committee and striking evidence of the tendency of the river to gradually regulate itself to such new conditions as confinement, under proper direction and control, may impose.

"'It should also be noted in this connection, that the greatest departure from this estimated ultimate flood height which has so far occurred, is at Red River Landing, still 3.67 feet below it, just where the first and most serious elevation of flood height resulting from the proposed separation may, if anywhere, be looked for.

"The Board of State Engineers, from this and other assurances, born of extended observation and long experience, is, therefore, disposed to feel that the closure of this one last outlet of the Lower Mississippi River—those immediately above its mouth, of course, excepted—cannot within itself, well bring about any material further increase in flood levels that cannot be successfully met by the levee system of the State when completed.

"At all events, this Board believes that the question is still sufficiently open not to permit it to seriously weigh against the proposition in advance of the most thorough investigation by competent authority.

"The ultimate flood height, whether resulting solely from the past leveeing in of large basins, closure of crevasses or outlets, or the separation of the Red and Atchafalaya Rivers from the Mississippi River, bears such an intimate relation to the second point of view of the effect on levees, namely, increase in and readjustment of grades, that the Board of State Engineers feels it its duty to impose upon your patience somewhat further to touch upon the question of the preparedness of the levee lines that may be affected.

FIRST—ON THE MISSISSIPPI RIVER.

"To the construction of the lines of public levee to the provisional grades recommended, from time to time, by the Mississippi River Commission, the efforts of all levee authorities in Louisiana have at all times, as rapidly and as far as their resources would permit, been faithfully and steadily directed, resulting, at this time, in practically continuous lines of levees in all the levee districts on the Mississippi river, above New Orleans, possessing margins of safety above the highest flood height of record, varying from 2.5 feet as the least to 6.5 feet as the greatest.

"At and in the vicinity of New Orleans and below, it is with regret that it must be recorded that the lines of public levee yet vary from as low as a half a foot to three and a half feet above the highest flood levels of the past. However, the aggregate lengths of the stretches of levee line herein referred to as being as low as only a half a foot above the highest water of record, is, from New Orleans to the lower ends of the systems on the east and west banks of the river, but about one per cent of the total length of levee lines between said points.

"Whether, therefore, the separation of the Red and Atchafalaya Rivers from the Mississippi River be ultimately brought about or not, vigorous measures are evidently still urgently required to adjust conditions along this part of the Mississippi River—that is, at and in the vicinity and below New Orleans—and the end of levee construction, under any circumstances, is yet far from being in sight.

"To bear out not only this statement, but also that in regard to the present grades of the controlling lines of levee on the Mississippi River, along that part of its length which may be affected, the following, the result of close investigation of the subject, is submitted:

"In Concordia Parish, where the provisional grade recommended by the Mississippi River Commission is, at L'argent (lower end Tensas Parish), 5.5 feet above the highest water of previous record; at Vidalia, 6.1 feet; at Bougere, 5.1 feet; 9 per cent of the total length of the levee line in the parish (82 miles), is more than 6 feet above the highest water of record; 40 per cent from 5 to 6 feet; 22 per cent from 4 to 5 feet; 26 per cent from 3 to 4 feet, and only 3 per cent less than 3 feet; the total number of

cubic yards of earthwork still required to adjust this line to this grade being 1,193,000.

"In the Atchafalaya Basin Levee District, from the mouth of Red River, or rather Old River, to Donaldsonville, west bank of the Mississippi River, where the provisional grade recommended by the Mississippi River Commission is 4.3 feet above the highest water of record at Red River Landing, and 4.2 feet above at Donaldsonville, 90 per cent of the 123.8 miles of levee line is from 4 to 5 feet above the highest water of record; 7 per cent 3 to 4 feet, and only 3 per cent from 2 to 3 feet; total number of cubic yards of earthwork still required to adjust this line to this grade, only 536,500.

"In the Pontchartrain Levee District, from Baton Rouge to New Orleans, east bank, where the provisional grade recommended by the Mississippi River Commission is 4.6 feet above the highest water of record at Baton Rouge and 4.0 feet at the upper line of Orleans Parish, 88 per cent of the 125.8 miles of the levee line is from 4 to 5 feet above the highest water of record; 9 per cent from 3 to 4 feet above, and only 3 per cent as low as from 2 to 3 feet; total number of cubic yards of earthwork still required to adjust this line to this grade, 394,000.

"In the Lafourche Levee District, from Donaldsonville to New Orleans, and from New Orleans to Riceland Plantation, Plaquemines Parish, west bank, where the provisional grade recommended by the Mississippi River Commission is 4.2 feet above the highest water of record at Donaldsonville, 4.0 feet above at New Orleans, and 3.5 feet at Riceland Plantation, 45 per cent of the 119.8 miles of the levee line is from 4 to 5 feet above the highest water of record; 41 per cent 3 to 4 feet above; 10 per cent 2 to 3 feet above; 3 per cent 1 to 2 feet above, and only 1 per cent less than 1 foot above; total number of cubic yards of earthwork still required to adjust this line to this grade, 520,500.

"In the Orleans Levee District, occupying both banks of the Mississippi River, within the upper and lower limits of the Parish of Orleans, where the provisional grade recommended by the Mississippi River Commission is about 3.4 feet above the highest water of record, of the 12.23 miles of levee line along the left or east bank, 17 per cent is from 4 to 5 feet above the highest water of record; 24 per cent from 3 to 4 feet above; 33 per cent from 2 to 3 feet above; 9 per cent from 1 to 2 feet above; 16.5 per cent from highest water to 1 foot above, and one-half of one per cent

is below high water. Of the 13.63 miles of levee line on the right or west bank, 14 per cent is from 4 to 5 feet above; 7 per cent from 3 to 4 feet above; 38 per cent from 2 to 3 feet above; 36 per cent from 1 to 2 feet above, and 5 per cent from high water to 1 foot above.

"The number of cubic yards of earthwork required to adjust the lines of levees in the Orleans Levee District to Mississippi River Commission provisional grade is not here presented, because the Orleans Levee District is of record in assuring the Mississippi River Commission that if the United States will handle the problem of bank protection required, within the limits of the district, the district will handle the problem of levee construction and maintenance. The yardage required to adjust the levees of the Orleans Levee District to proper grades, etc., should, therefore, not be regarded as a factor in estimating the cost to the United States of the proposition under consideration.

"In this connection, too, it would be well to recall that the Orleans Levee District has inaugurated and is prosecuting levee work on a very large scale, based upon the recommendations of the Board of State Engineers, as to grade and section, viz:

"*Grade:* Five (5) feet, net, above the high water of 1903.

"*Section:* Left bank, crown not less than fifty (50) feet wide, river side slope not steeper than 3 to 1, and land side slope not steeper than 10 to 1; right bank, crown not less than ten (10) feet wide, river side slope not steeper than 3 to 1, and land side slope not steeper than 4 to 1.

"To comply with the foregoing grade and section, it is estimated at this time that as much as 2,189,000 cubic yards of earthwork will be required for the left bank, and 661,200 cubic yards for the right bank, or a total of 2,850,200 cubic yards.

"In the Lake Borgne Basin Levee District, from New Orleans to the lower line of Bohemia Plantation, Plaquemines Parish, east bank, where the provisional grade recommended by the Mississippi River Commission is 3.4 feet, and 3.0 feet, above the highest water of record, at Jackson Barracks and Bohemia Plantation, respectively, 40 per cent of the 47.9 miles of the levee line is from 3 to 4 feet above the highest water of record; 32 per cent 2 to 3 feet above; 22 per cent 1 to 2 feet above; 6 per cent less than 1 foot above. Total number of cubic yards required to adjust this line to this grade, about 827,000.

"In the Buras Levee District, from Riceland Plantation to The Jump, Plaquemines Parish, west bank, where the provisional grade recommended by the Mississippi River Commission is 3.0 feet above the high water of 1903, at Riceland Plantation, and 3.0 feet above the high water of 1907, at Fort Jackson and The Jump, 26 per cent of the 34.1 miles of the levee line is from 3 to 4 feet above the highest water of record; 17 per cent 2 to 3 feet; 34 per cent 1 to 2 feet; and 23 per cent less than 1 foot. Total number of cubic yards required to adjust this line to this grade, about 429,500.

"In the Grand Prairie Levee District, extending from the lower line of Bohemia Plantation to the lower side of Baptiste Collette Gap, Plaquemines Parish, east bank, where the provisional grade recommended by the Mississippi River Commission is 3.0 feet above the high water of 1903 at Bohemia Plantation, and 3.0 feet above the high water of 1907 at Fort St. Philip, 50 per cent of the 30.1 miles of the levee line is from 3 to 4 feet above the highest water of record; 27 per cent 2 to 3 feet above; 18 per cent 1 to 2 feet above, and 5 per cent less than 1 foot above. Total number of cubic yards required to adjust this line to this grade, about 230,500.

"The total yardage in Concordia Parish, and in the levee districts herein named, facing the Mississippi River, that may be affected by the proposition to separate the Red and Atchafalaya Rivers from the Mississippi River, still required to adjust the grades of the present controlling lines of levee to Mississippi River Commission provisional grade, is, therefore, apparently only about 4,131,000 cubic yards, exclusive of the Orleans Levee District.

"What the difference may be between this amount and that which it may be necessary to add to care for such additional flood height as may be brought about by the separation of the Red and Atchafalaya Rivers from the Mississippi River would be difficult for any one to say, as the result must, at this time, be premised upon assumptions still permitting a wide range for speculation.

"The Board of State Engineers, at all events, feels justified, along much stronger grounds, in expressing the opinion that, whether the separation of the Red and Atchafalaya Rivers from the Mississippi River, be ultimately effected or not, higher water may confidently, sooner or later, be looked for on the Lower Mississippi River, and that the separation of the streams in question will little, if at all, aggravate such a situation, and that it, there-

fore, behooves the levee authorities along this part of the Mississippi River, under any circumstances, to continue to direct their energies towards higher and broader embankments, in making provision for which, that which may be estimated as additionally necessary to guard against any increase in flood levels possibly resulting from the separation of the Red and Atchafalaya Rivers from the Mississippi River should not materially disturb them.

"The grounds upon which the Board of State Engineers justifies this opinion in regard to higher flood levels on the lower river, independent of the problem of separation, are based, first, upon the constantly apprehended possibility, if not probability, of a conjunction of extreme high stages of water in a greater number of the main tributaries to the river, if not in all of them, at one and the same time, than in the past; and, second, the failure to so far extend the lines of public levees on the Mississippi River all the way to its mouth.

"From these two elements of disturbance to the regimen of the river, the one, of course, only merely a probability, but the other a self-evident fact, the Lower Mississippi River has, in the opinion of the Board of State Engineers, far more to fear towards higher high waters on the Mississippi River in the future than from the proposition to separate the Red and Atchafalaya Rivers from the Mississippi River.

"While it may be true that the steady leveeing of the Mississippi River, throughout its alluvial valley, involving the closure of so many vast basins, which, at first, served as temporary reservoirs for its passing surplus waters, to the exclusion and condemnation of all else in the basin, may have, as already shown, raised, to a material extent, flood levels within the confined limits, it has not followed, in later years, after the beneficial effects of this confinement have been established, that the closure of any one or more additional outlets from the river has in any way seriously aggravated the flood levels then attained.

"In the great overflow years of the past, many crevasses have occurred on the Mississippi River in our State, some of which, in one year and then another, diverted from the main river at one time and then another, a larger volume of water by far than can well be claimed for the escape from the river, through Old River, and the unleveed stretch between there and Point Breeze, yet there was no hesitation whatever, on the part of all concerned, the following season, or as soon thereafter as the means were provided, in

closing each and all of these crevasses or outlets without thought or fear of the results on flood levels in the Mississippi River.

"In evidence of this, not to go back any great length of time, only within the past two years, the great Bougere Crevasse, in Concordia Parish, only about twenty miles above the mouth of Red River, running in high water five miles wide and twenty feet deep, has been closed, and the last two high waters taken care of without outcry reaching the ears or attention of the Board of State Engineers about increased flood levels either in that vicinity or elsewhere.

"In fact, had this bugbear, once so popular among laymen, been, in the past, permitted to sway the activities of the Engineers and levee authorities, the State of Louisiana would still be largely in a state of nature—the Paradise of the crocodile.

ON RED RIVER (LOWER RED RIVER) AND THE ATCHAFALAYA RIVER.

"As long as this separation between the Red and Atchafalaya Rivers and the Mississippi River be deferred, extensive lines of levees to effectually guard large areas of land, the fertility and productiveness of which, when reclaimed, cannot well be overestimated, against the injurious influences of floods received from the Mississippi River, will be required along parts of the Lower Ouachita River and Black River, and all along the Lower Red River, the Atchafalaya River, Bayou des Glaizes and Bayou Courtableau.

"Such levees as now exist on the Ouachita and Black Rivers are fragmentary and far from efficient under almost any condition. On that part of Red River affected, the lines of levees, at the present time, along its right bank, while excellent as far as they extend, still fail to reach the proper lower terminus by over fifty miles, while of the seventy-five miles required on the left bank, only about ten miles have so far been built. On the Atchafalaya River, right bank, of the 100 miles of levee required, but about 37 miles have so far been built; left bank, of the 60 miles of levee practicable at this time, or at any time within the near future, but 43 miles have been so far built. On Bayou des Glaizes, right bank, the system is practically completed; left bank, no part yet undertaken; length of line required, some 50 miles. On Bayou Courtableau, no part of the levee line required on either bank has yet been undertaken; lengths of line required, about 20 miles on each bank.

"Information on which to base anything like a close estimate of the number of cubic yards of earthwork required to improve existing lines of levee along the banks of these streams, and construct the extensions demanded, is not at hand, but, from a general knowledge of the situation, it may be safely said that the yardage required under present controlling conditions will very certainly not fall short of 20,000,000 cubic yards, fully one-half of which might be eliminated and dispensed with under the proposition to separate the Red and Atchafalaya Rivers from the Mississippi River.

"This, coupled with the reduction of the flood heights on Lower Red River and the Atchafalaya River, resulting from the separation of these streams from the Mississippi River, should present a strong appeal in favor of that section of the State which recives no direct aid from the United States in the construction and maintenance of the levee systems required upon them.

"Finally, the Board of State Engineers, after weighing all these considerations, is disposed to place itself on record as being in favor of the project as a general proposition, taken up at the proper time and in its proper order. It certainly would appear to be a logical sequence to all that has gone before in the light of river improvement, from both the standpoint of navigation and protection from overflow.

"The Board of State Engineers also desires to express the conviction that the intimate study which the proposition demands has been given into the proper hands, the Mississippi River Commission, and that all interested may rely upon an exhaustive review of all the facts connected with it by the Commission, and an impartial, logical and comprehensive conclusion by it."

Stages of the Rivers, and Certain Attendant Conditions.

From the following table, showing the highest water of previous record, as well as the stages attained in 1908, 1909 and 1910, up to April 20, 1910, or the date of this Report, at stations mostly governing high-water conditions affecting Louisiana, it will be seen that the high waters of 1908 and 1909, though closely approaching the highest water of previous record at some points, exceeded them at no point on the Mississippi River. On Red River and the Atchafalaya River, however, the highest water of previous record at Alexandria and at David's Ferry was exceeded by 3.6 and 5.5 feet, respectively, and at Melville by 1.0 foot.

LOCALITY	Highest Water of Previous Record		High Water 1908		High Water 1909		High Water 1910 to April 20, 1910	
	Gauge Reading	Year	Gauge Reading	Below Highest Water	Gauge Reading	Below Highest Water	Gauge Reading	Below Highest Water
MISSISSIPPI RIVER—								
Memphis, Tenn	40.30	1907	35.55	4.75	38.60	1.70	33.30	7.00
Arkansas City, Ark	52.90	1903	49.90	3.00	50.10	2.80	43.10	9.90
Greenville, Miss	49.10	1903	44.75	4.35	44.80	4.35	36.90	12.20
Lake Providence, La	46.48	1903	44.10	2.38	44.40	2.08	36.90	9.58
Vicksburg, Miss	52.48	1897	47.80	4.68	48.20	4.28	40.50	11.98
St. Joseph, La	48.07	1903	44.75	3.32	45.20	2.87	36.30	11.77
Natchez, Miss	50.35	1903	48.70	1.65	47.90	2.45	40.30	10.05
Red River Landing, La	50.20	1897	48.74	1.46	46.00	4.20	38.50	11.70
Baton Rouge	40.65	1897	39.60	1.05	36.20	4.45	29.70	10.95
Donaldsonville	32.75	1897	31.60	1.15	28.70	4.05	23.00	9.75
Carrollton	19.42	1903	18.75	0.67	16.60	2.82	12.90	6.52
New Orleans	20.30	1903	20.00	0.30	17.90	2.40	14.40	5.90
Fort Jackson	8.30	1907	8.10	0.20	7.60	0.70	6.10	2.20
RED RIVER—								
Fulton, Ark	35.75	1876	33.95	1.80	20.60	15.15	21.80	13.95
Shreveport, La	35.70	1892	35.10	0.60	10.20	25.50	13.80	21.90
Alexandria, La	38.20	1892	41.80	+3.6*	22.30	19.52	22.30	19.52
ATCHAFALAYA RIVER—								
Barbres Landing	50.95	1897	48.00	2.95	43.00	7.95	35.80	15.65
Melville	38.70	1903	39.70	+1.0*	36.10	3.60	31.50	8.20

*Above highest water of previous record.

While it is a fact, as shown in the foregoing table, that the high waters of 1908, 1909 and so far in 1910, on the Mississippi River did not at any point exceed the high waters of previous record, the further fact should not be lost sight of that in 1908 stages *were* reached which, in former years, before the great improvement made in the levee lines on the Mississippi River, would have subjected the State to serious inundation.

But one crevasse occurred in the levee line on the Mississippi River, during the period covered by this Report. This crevasse developed on June 6, 1908, at the Beka Plantation, in the Parish of Orleans, west bank of the Mississippi River, about 15 miles by river below Algiers, opposite New Orleans. It was, however, closed within the course of fifteen days from its incipiency, inflicting little material damage to property or crops. The crevasse resulted from crayfish holes, with which the levee line in that vicinity was for quite a distance largely honeycombed.

On Red River the high water of 1908 was one of the most notable in the history of that river. From its headwaters down to the Atchafalaya River previous high water records were materially exceeded in many places, while, at other points, the river was as high as, or lacked but a few inches of reaching the highest water of previous record.

Above the Louisiana line, in Arkansas, the water flowed over the river banks, broke through all barriers and spread over the Valley, causing a general overflow, and the levee systems on Red River in the State of Louisiana, below, were tested to their utmost. The levees on Red River, above East Point, in Red River Parish, and on the Atchafalaya River between Simmsport and Melville possessed ample margins of safety above the high water of 1908, both in grade and section; but, owing to the greatly increased velocity of the current, due to the higher stage of the river and the many cut-offs occurring in recent years, the river banks were, during this high water, attacked to an almost unprecedented extent, by caving. In fact, so great was this amount of caving that it caused the loss of considerable portions of the levee systems of the Caddo and Bossier Levee District. To such an extent did this prevail that some sixteen per cent of the line of levee in the Caddo Levee District, and over ten per cent of the line of levee in the Bossier Levee District had to be rebuilt. This estimate includes no enlargement work, only new levees rendered necessary by reason of the former ones having

caved into the river. Nor does it include some forty emergency loops, or run-arounds, the hasty erection of which was rendered imperative, at great labor and cost, during the period of high water itself, and which, though the salvation of these districts from overflow at the time, could not later on be utilized as parts of the permanent levee system.

During this high water the river at all points above Shreveport, was successfully confined by the then existing lines of levees, and the emergency loops referred to. Below Shreveport, however, three crevasses occurred, causing overflow to approximately ten per cent of the area of the Caddo Levee District, and twenty per cent of the area of the Bossier Levee District. These crevasses were directly due to rapidly caving banks, carrying away the controlling lines of levees, except that which occurred at Connell Station, where, through an error of judgment on the part of a riparian agent, the safeguard provided in the specifications under which the new levee there had been built was opposed and ignored.

Referring to the disasters occurring during the flood of 1908 on Red River from caving banks, it would certainly appear that, unless active steps be taken at an early date to prevent further cut-offs in Red River, between the upper line of the State and Coushatta, and unless rectification by means of bank protection work be hastened, it must prove an almost endless task, more than taxing the available resources of the levee districts, the State and the United States to maintain lines of levees in the Caddo and Bossier Levee Districts.

As a matter of fact, the failures in the lines of public levees in the Caddo and Bossier Levee Districts, during 1908, were the result in all but the one instance, that at Connell Station, not of insufficient grade, not of scantiness of section, but of caving banks, for which the numerous cut-offs of the past were mostly responsible. United States regulation is most certainly in urgent demand right here, not only for the protection of the country from overflow, but for the improvement and maintenance of navigation as well.

There are, within the limits of the Bossier and Caddo Levee Districts, three cut-offs which are about to develop, and several others where conditions are growing ripe for other cut-offs. The three imminent cut-offs, at this time, are at Boone's Bend, Adger

Lake and Gold Point. Those approaching the acute stage are, Sunny Point, Long Point, White Hall and China Grove-Christiana. A cut-off occurred at Cross Keys during the flood of 1908, and the following points were so shortened by consequent rapid caving as to also virtually amount to cut-offs, viz.: Cash Point, Pat Cash Place, Dillard's Place, Clay Place, Caldwell's Point, Peace Point and Gold Dust.

When the crest of the high water wave of 1908 reached Alexandria, which is situated practically at the head of the Red River, Atchafalaya and Bayou Bœuf Levee District, the previous high water of record, 1892, was exceeded by 3.6 feet, and, as the standard to which the greater length of the line of levee on this part of Red River had so far been constructed was but 3.0 feet above high water, a most serious condition of affairs was brought about, and it became necessary to hastily provide additional height for many miles of the line.

The highlands on the banks of Bayou Rapides, above Alexandria, constituting the head of the levee system on this part of Red River, previously regarded as standing above high water, were, during the high water of 1908, found much too low. This condition, on Bayou Rapides, maintained for a distance of approximately twenty miles.

Near the lower end of the Red River, Atchafalaya and Bayou Bœuf Levee District, above David's or Moncla's Ferry, the highest water of previous record, was exceeded by 5.5 feet, up to the time that breaches in the lines of levees at the Experiment and Clark places, in the Saline Levee and Drainage District, occurred. The water along this part of Red River, in the Red River, Atchafalaya and Bayou Bœuf Levee District, was restrained from overtopping the levees, for a distance of over ten miles, only by emergency capping; and, with the exception of some fourteen miles of levee line immediately below Alexandria, which had fortunately been constructed to a grade 4 feet above the highest water of previous record, for many miles more only a few inches of margin existed. There were also four places in this part of this district on Red River where caving breached the controlling line of levee and hastily constructed emergency loops became necessary.

The levee system of the Red River and Bayou des Glaizes Levee and Drainage District, which is separated from the Red River,

Atchafalaya and Bayou Bœuf Levee District by only a narrow spur of high ground jutting out from the Avoyelles Prairies, proved also low as compared with the high water of 1908 for over 5 miles along its upper end, and demanded material enlargement.

The Saline Levee and Drainage District, on the left bank of this part of Red River, was visited by serious disaster during this high water. Its system was overtopped for its entire length, and was breached in two places, besides having its lower end, where extension work was in progress, washed away for one-quarter of a mile.

On the right and left descending banks of the Atchafalaya River, but little trouble was experienced during this high water. Above Melville, however, two new levees were subsequently rendered necessary on the right bank and two on the left bank by caving banks, resulting from the influences of high water. Below Melville, the levee line was found to be much too low and a new grade had to be established for both sides of this part of the Atchafalaya River.

In connection with the stages of the rivers since the last Biennial Report of the Board of State Engineers, a table will be found in Appendix "B," giving the "dates, gauge readings and elevations, Cairo datum, of highest and lowest water, at the same stations, during 1908, 1909 and 1910 (to April 20), compared with highest and lowest waters of previous records."

In Appendix "B" will also be found a table giving "Records of Highest Waters for Stations and Years Indicated, Since 1871."

The situation in the State to-day, as reflected by immediate river conditions, may readily be said to be safe.

The rivers in which the State is directly concerned have so far this season at no point reached high water stages by appreciable margins; and from indications shown in the River Bulletin of the United States Weather Bureau, to-day, it may also be said that unless further material precipitation occur at an early date in the various basins tending to produce flood conditions in Louisiana, no extreme stages are likely to develop in the State in the near future.

Notwithstanding this fact, it is yet too early in the season to assume that the State will prove to be so fortunate as to wholly escape high water conditions this year.

APPENDICES.

Tabular statements showing details of the levee work of the past two years, and important statements of high water records, will be found in the Appendices following this Report.

Appendix "A." Tabular statements relative to location, length, quantity and cost of levee work undertaken by the State of Louisiana, the several levee districts of the State, and the United States, in Louisiana and a part of Arkansas, from April 20, 1908, to April 20, 1910.

Appendix "B." Tabular statements relative to high water records.

In conclusion the Board of State Engineers wishes to express its high appreciation of the efficient and valuable services rendered by its corps of employees, namely: G. W. Lawes, Secretary; A. C. Duval, Chief Draftsman; R. W. Richardson, Assistant Draftsman; A. Guibet, Assistant Secretary, Stenographer and Typewriter; J. R. Adams, Walter P. Villere, J. F. Villavaso and F. B. Grevemberg, Jr., Levelers; Robert J. Smith, Rodman, and C. M. Moore, Clerk.

Respectfully submitted.

THE BOARD OF STATE ENGINEERS.

FRANK M. KERR,
Chief State Engineer.
GERVAIS LOMBARD,
WALTER H. HOFFMAN,
H. C. SMITH,
J. W. MONGET,
Assistant State Engineers.

G. W. LAWES, *Secretary.*

APPENDIX A.

TABULAR STATEMENTS RELATIVE TO LOCATION, LENGTH, QUANTITY AND COST OF LEVEE WORK, DRAINAGE, REVETMENT, ETC., UNDERTAKEN BY THE STATE OF LOUISIANA, THE SEVERAL BOARDS OF LEVEE COMMISSIONERS, AND THE UNITED STATES, IN LOUISIANA AND A PART OF ARKANSAS, FROM APRIL 20, 1908, TO APRIL 20, 1910.

Note: The number of cubic yards given in the following statements for work done by the levee districts is based upon the list of dimensions furnished and estimates made by the Board of State Engineers for the levees named, and the cost is obtained by applying the price per cubic yard bid for the work, without regard to discount, interest or other incidental expenses incurred by the Levee Commissioners.

Levee work undertaken by the State of Louisiana, in the several Levee Districts, under sixty-three contracts entered into from April 20, 1908, to April 20, 1910, with sixteen contracts of earlier date, not completed April 20, 1908.

Number	Name of Contract.	Parish.	DATE OF		LINEAR FT.		Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
			Contract.	Final Certificate.	New Levee.	Enlargement.					
	FIFTH LOUISIANA LEVEE DISTRICT.										
1	Ashtabula Plantation to Pilcher's Landing	East Carroll.	Sept. 24, 1907	Oct. 23, 1909	.....	25,593	251,901	$66,501.85	26.40	Mississippi Riv.	See Dis. Contract.
2	Cottonwood	East Carroll.	May 29, 1908	Jan. 11, 1909	2,387	.....	93,048	19,074.84	20.50	Mississippi Riv.	
3	Longwood	East Carroll.	Nov. 21, 1905	Jan. 21, 1909	.....	7,250	60,949	9,416.62	15.45	Mississippi Riv.	
	Donna Vista Sect..	East Carroll.	.....	.....	.....	6,292	57,379	8,865.05	15.45	Mississippi Riv.	See Dis. Contract.
4	Maguire to Hollybr'k	East Carroll.	April 2, 1907	Mar. 15, 1909	.....	11,500	131,372	32,843.00	25.00	Mississippi Riv.	
5	Duckport	Madison.....	Dec. 24, 1907	June 8, 1908	2,841	.....	45,018	9,003.60	20.	Mississippi Riv.	See Dis. Contract
6	Ingefield	Tensas.....	Jan. 3, 1910	.....	6,287	.....	315,000	63,000.00	20.	Mississippi Riv.	for Ramp.
7	Sycamore	Concordia....	Oct. 29, 1909	.....	2,994	.....	53,027	8,192.67	15.45	Mississippi Riv.	
8	Minorca to Palo Alto.	Concordia....	Aug. 20, 1908	Mar. 1, 1909	.....	16,368	94,745	18,645.82	19.68	Mississippi Riv.	
9	Upper Green.....	Concordia....	Oct. 28, 1909	.....	7,493	.....	293,128	65,660.67	22.40	Mississippi Riv.	
10	Lower Green.....	Concordia....	Jan. 3, 1910	.....	3,875	.....	147,101	36,775.25	25.00	Mississippi Riv.	
	Totals.....				25,877	67,003	1,542,668	$337,979.37	.....		
	Less work done previous to Apr. 20,'08, and not comp'd Apr. 20,'10.				13,687	20,462	761,560	164,094.61	.....		
	Work done from April 20, 1908, to April 20, 1910.....				12,190 or 2.31 miles.	46,541 or 8.81 miles.	781,108	173,884.76	.....		{Aver. price per cu. yd. 20.06 cts.

ATCHAFALAYA BASIN LEVEE DISTRICT.

11	Raccourci	Pointe Coupee	Aug.	27, 1907	Mar.	4, 1909	12,426	12,176	434,042	$101,999.87	23.50	Mississippi Riv.	See Dis. Contract.
12	Soniat	Iberville	July	9, 1909	Feb.	9, 1910	2,614	.....	104,861	18,874.98	18.	Mississippi Riv.	
	Totals						15,040	12,176	538,903	$120,874.85	.....		
	Less work done previous to April 20, 1908						1,263	7,522	175,851	41,325.00	.....		
	Work done from April 20, 1908, to April 20, 1910						13,777 or 2.60 miles.	4,654 or 0.88 miles.	363,052	$79,549.85	....		Aver. price per cu. yd., 21.91 cts.

PONTCHARTRAIN LEVEE DISTRICT.

13	Arlington	E. Baton Rouge	July	17, 1908	Feb.	3, 1909	2,350	.....	80,000	$20,000.00	25.	Mississippi Riv.	See Dis. contract.
14	Arlington to Conrad	E. Baton Rouge	Jan.	7, 1908	Jan.	21, 1909	2,810	9,646	137,019	23,749.96	17½	Mississippi Riv.	See Dis. contract.
15	Hope	St. John	Oct.	31, 1906	Oct.	31, 1908	2,271	1,888	128,194	27,497.61	21.45	Mississippi Riv.	
16	Gypsy	St. Charles	Sept.	30, 1909			1,895	.....	50,227	7,986.09	15.90	Mississippi Riv.	
17	Southport	Jefferson	Oct.	28, 1909	Mar.	11, 1910	1,500	122	48,351	14,490.79	29.97	Mississippi Riv.	See Dis. Contract.
	Totals						10,826	11,656	443,791	$93,724.45	.....		
	Less work done previous to Apr. 20, '08, and not comp'd Apr. 20, '10.						3,795	6,466	169,627	31,996.00	.....		
	Work done from April 20, 1908, to April 20, 1910						7,031 or 1.33 miles.	5,190 or 0.98 miles.	274,164	$61,728.45	.....	.....	Aver. price per cu., yd., 22.55 cts.

LAFOURCHE LEVEE DISTRICT.

18	Sims	Ascension	Oct.	28, 1909			.....	1,455	7,258	$1,807.24	24.90	Mississippi Riv.	
19	Lauderdale	St. James	Sept.	24, 1907	Oct.	23, 1908	1,795	.....	55,124	12,072.20	21.90	Mississippi Riv.	
20	St. Louis	St. James	Sept.	24, 1907	Dec.	30, 1908	1,290	.....	52,289	11,974.18	22.90	Mississippi Riv.	
21	Harvey	Jefferson	Sept.	20, 1909	Mar.	8, 1910	825	.....	14,886	2,902.77	19.50	Mississippi Riv.	
22	Belle Chasse	Plaquemines	Oct.	31, 1908	Jan.	20, 1909	1,685	.....	9,146	2,499.90	27½	Mississippi Riv.	See Dis. Contract.
23	Belle Chasse	Plaquemines	Sept.	20, 1909	Dec.	1, 1909	3,084	.....	41,798	6,244.62	14.94	Mississippi Riv.	
24	Concord	Plaquemines	Sept.	15, 1908	Jan.	30, 1909	2,020	.....	35,249	10,045.96	28½	Mississippi Riv.	
25	Concord-Oak Point	Plaquemines	Sept.	2, 1909	Feb.	2, 1910	2,918	.....	58,611	8,498.59	14.50	Mississippi Riv.	
26	Oak Point	Plaquemines	Sept.	15, 1908	Jan.	12, 1909	1,815	.....	26,472	7,147.44	27.	Mississippi Riv.	
27	Woodland	Plaquemines	Oct.	29, 1907	Dec.	21, 1908	.....	4,490	22,384	8,058.24	36.	Mississippi Riv.	
	Totals						15,432	5,945	323,217	$71,251.14	.....		
	Less work done previous to Apr. 20, '08, and not comp'd Apr. 20, '10.						.....	4,155	20,877	6,710.08	.....		
	Work done from April 20, 1908, to April 20, 1910						15,432 or 2.92 miles.	1,790 or 0.33 miles.	302,340	$64,541.06	.....	.....	Aver. price per cu. yd., 21.34 cts.

APPENDIX A.

TABULAR STATEMENTS RELATIVE TO LOCATION, LENGTH, QUANTITY AND COST OF LEVEE WORK, DRAINAGE, REVETMENT, ETC., UNDERTAKEN BY THE STATE OF LOUISIANA, THE SEVERAL BOARDS OF LEVEE COMMISSIONERS, AND THE UNITED STATES, IN LOUISIANA AND A PART OF ARKANSAS, FROM APRIL 20, 1908, TO APRIL 20, 1910.

Note: The number of cubic yards given in the following statements for work done by the levee districts is based upon the list of dimensions furnished and estimates made by the Board of State Engineers for the levees named, and the cost is obtained by applying the price per cubic yard bid for the work, without regard to discount, interest or other incidental expenses incurred by the Levee Commissioners.

Levee work undertaken by the State of Louisiana, in the several Levee Districts, under sixty-three contracts entered into from April 20, 1908, to April 20, 1910, with sixteen contracts of earlier date, not completed April 20, 1908.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
	FIFTH LOUISIANA LEVEE DISTRICT.										
1	Ashtabula Plantation to Pilcher's Landing	East Carroll.	Sept. 24, 1907	Oct. 23, 1909	.....	25,593	251,901	$66,591.85	26.40	Mississippi Riv.	See Dis. Contract.
2	Cottonwood	East Carroll.	May 29, 1908	Jan. 11, 1909	2,387	.....	93,948	19,074.84	20.50	Mississippi Riv.	
3	Longwood	East Carroll.	Nov. 21, 1905	Jan. 21, 1909	.....	7,250	60,949	9,416.62	15.45	Mississippi Riv.	
	Donna Vista Sect..	East Carroll.	.....	.....	.....	6,292	57,379	8,865.05	15.45	Mississippi Riv.	See Dis. Contract.
4	Maguire to Hollybr'k	East Carroll.	April 2, 1907	Mar. 15, 1909	.....	11,500	131,372	32,843.00	25.00	Mississippi Riv.	
5	Duckport	Madison.....	Dec. 24, 1907	June 8, 1908	2,841	.....	45,018	9,003.60	20.	Mississippi Riv.	See Dis. Contract for Ramp.
6	Ingefield	Tensas.....	Jan. 3, 1910	.....	6,287	.....	315,000	63,000.00	20.	Mississippi Riv.	
7	Sycamore	Concordia....	Oct. 29, 1909	.....	2,994	.....	53,027	8,192.67	15.45	Mississippi Riv.	
8	Minorca to Palo Alto.	Concordia....	Aug. 20, 1908	Mar. 1, 1909	.....	16,368	94,745	18,645.82	19.68	Mississippi Riv.	
9	Upper Green.....	Concordia....	Oct. 28, 1909	.....	7,493	.....	293,128	65,660.67	22.40	Mississippi Riv.	
10	Lower Green.....	Concordia....	Jan. 3, 1910	.....	3,875	.....	147,101	36,775.25	25.00	Mississippi Riv.	
	Totals.....				25,877	67,003	1,542,668	$337,979.37	.....		
	Less work done previous to Apr. 20, '08, and not comp'd Apr. 20, '10.				13,687	20,462	761,560	164,094.61	.....		
	Work done from April 20, 1908, to April 20, 1910.....				12,190 or 2.31 miles.	46,541 or 8.81 miles.	781,108	173,884.76	.....		Aver price per cu. yd. 20.06 cts.

RED RIVER PARISH SUB-LEVEE DISTRICT.

68	Murrell	Red River	Nov. 12, 1908	Oct. 9, 1909	2,300	.....	25,517	$5,345.81	20.95	Red River.	
69	Westdale	Red River	Nov. 12, 1908	Oct. 9, 1909	4,800	.....	23,092	2,713.31	11.75	Red River.	
	Work done from April 20, 1908, to April 20, 1910				7,100 or 1.34 miles.	.....	48,609	$8,059.12	.....	.....	Aver. price per cu. yd., 16.60 cts.

RED RIVER, ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

70	Alexandria Front Sec. No. 2	Rapides	Oct. 31, 1908	Jan. 21, 1909	.....	2,032	19,346	$5,126.69	26.50	Red River.	
71	Alexandria Front Sec. No. 1	Rapides	Oct. 31, 1908	Mar. 18, 1909	.....	4,000	9,803	4,999.53	51.	Red River.	See Dist. Contract.
72	Alexandria Front	Rapides	Sept. 20, 1909	Mar. 19, 1910	2,805	.....	33,958	10,187.40	30.	Red River.	
73	Sunny Home	Rapides	Sept. 20, 1909	Feb. 24, 1910	3,172	.....	64,262	7,968.49	12.40	Red River.	
74	Melville to Latanier	St. Landry	Aug. 19, 1908	.....	.....	20,000	78,513	25,000.03	Sc'le	Atchafalaya Riv	
	Work done from April 20, 1908, to April 20, 1910				5,977 or 1.13 miles.	26,032 or 4.93 miles.	205,881	$53,282.14	.....	.....	Aver. price per cu. yd., 25.88 cts.
	The above is divided by streams as follows:				Miles.						
	Atchafalaya River				.....	3.79	78,512	$25,000.03	.....		
	Red River				1.13	1.14	127,369	28,282.11	.....		
	Totals				1.13	4.93	205,881.	$53,282.14	.....		

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
					LAKE BORGNE BASIN LEVEE DISTRICT.						
28	Poydras	St. Bernard	Jan. 22, 1910	Mar. 23, 1910	1,487	.....	26,623	$3,652.67	13.72	Mississippi Riv.	
29	Stella	Plaquemines.	Oct. 28, 1909	Jan. 27, 1910	925	.....	12,937	2,263.97	17½	Mississippi Riv.	
30	Fanny	Plaquemines.	Oct. 5, 1908	Jan. 9, 1909	3,115	.....	50,901	11,936.28	23.45	Mississippi Riv.	
31	Belair	Plaquemines.	Sept. 20, 1909	Dec. 24, 1909	265	.....	2,798	740.91	26.48	Mississippi Riv.	
32	E. Duplesis	Plaquemines.	Sept. 20, 1909	.....	1,755	.....	22,366	3,332.53	14.90	Mississippi Riv.	
33	Arnold Cosse	Plaquemines.	Nov. 27, 1909	.....	1,605	.....	20,972	3,670.10	17½	Mississippi Riv.	
34	Upper Bohemia	Plaquemines.	Oct. 16, 1907	Jan. 14, 1909	2,329	.....	26,526	6,628.85	24.99	Mississippi Riv.	
35	Lower Bohemia	Plaquemines.	Oct. 16, 1907	Jan. 29, 1909	.....	7,070	59,658	14,019.63	23½	Mississippi Riv.	
	Totals				11,481	7,070	222,781	$46,244.94	.....		
	Less work done previous to April 20, 1908				2,250	3,100	46,841	11,362.87	.....		
	Work done from April 20, 1908, to April 20, 1910				9,231 or 1.75 miles.	3,970 or 0.75 miles.	175,940	$34,882.07	.....	.....	Aver. price per cu. yd., 21.90 cts.
					BURAS LEVEE DISTRICT.						
36	Riceland to Home Place	Plaquemines.	Sept. 15, 1908	Mar. 12, 1909	1,213	11,778	45,322	$23,782.83	24.48	Mississippi Riv.	Inc. $12,688.00 for revt.
37	St. Patrick's Church	Plaquemines.	Nov. 26, 1909	Feb. 14, 1910	624	.....	6,019	2,025.22	18.24	Mississippi Riv.	Inc. $927.36 for revt.
38	Gregory	Plaquemines.	July 14, 1908	Nov. 10, 1908	1,127	.....	11,722	2,751.15	23.47	Mississippi Riv.	Inc. $683.26 for revt.
39	Felix Hingle	Plaquemines.	Oct. 28, 1909	Jan. 28, 1910	538	.....	4,543	1,569.14	19.50	Mississippi Riv.	
40	Kamlah Revetment	Plaquemines.	Oct. 29, 1907	Nov. 11, 1908	.....	.....	.....	2,818.08	$1.03	Mississippi Riv.	2,736 feet of revetm'nt.
41	Bulot	Plaquemines.	Nov. 26, 1909	Feb. 8, 1910	603	.....	5,406	2,410.80	28.00	Mississippi Riv.	Inc. $897.12 for revt.
42	Lee Rice to Clinton	Plaquemines.	Oct. 29, 1909	Mar. 4, 1910	1,172	1,031	14,481	5,228.72	17.	Mississippi Riv.	Inc. $2,776.95 for revt.
43	Clinton	Plaquemines.	Sept. 25, 1906	Mar. 13, 1909	257	1,606	12,448	2,406.62	19⅓	Mississippi Riv.	Inc. $6,557.00 for revt.
	Bougon section	Plaquemines.	.....	.....	435	.....	3,403	657.91	19⅓	Mississippi Riv.	Inc. $5,718.60 for revt.
	Totals				5,969	14,415	103,344	$43,650.47	.....		
	Less work done previous to April 20, 1908				.....	1,606	10,688	4,884.43	.....		
	Work done from April 20, 1908, to April 20, 1910				5,969 or 1.13 miles.	12,806 or 2.42 miles.	92,656	$38,766.04	.....	.....	Aver. price per cu. yd., 22.45 cts.

GRAND PRAIRIE LEVEE DISTRICT.

44	Fox	Plaquemines.	Oct. 4, 1909		2,090	840	30,300	$4,238.97	13.99	Mississippi	Riv.	
45	Pinaud	Plaquemines.	Sept. 15, 1909	Jan. 9, 1910	1,041	.....	9,523	1,637.95	17.20	Mississippi	Riv.	
46	Waltzer	Plaquemines.	Sept. 30, 1909	Mar. 7, 1910	2,040	.....	19,331	2,493.70	12.90	Mississippi	Riv.	
47	Cannon to Nestor	Plaquemines.	Sept. 15, 1908	Jan. 9, 1909	.....	8,300	23,493	12,038.70	23½	Mississippi	Riv.	Inc. $6,557.00 for rev't.
48	Point Pleasant	Plaquemines.	Oct. 16, 1907	Feb. 20, 1909	.....	5,295	23,212	11,831.09	26⅛	Mississippi	Riv.	Inc. $5,718.60 for rev't.
49	New Canal	Plaquemines.	Oct. 28, 1909	Feb. 4, 1910	.....	6,385	11,922	1,642.85	13.78	Mississippi	Riv.	
50	Baptiste Collette Gap	Plaquemines.	Oct. 1, 1906	May 14, 1909	6,451	.....	39,711	12,590.18	38.	Mississippi	Riv.	{ Oys. Com. paid $1,000 / G. P. Dis. paid $1,500
51	Baptiste Collette Gap	Plaquemines.	Dec. 13, 1909	Feb. 28, 1910	.....	.....	.....	1,787.20	.....	Mississippi	Riv.	Work done by force account.
	Totals				11,622	20,820	157,492	$48,260.64	.....			
	Less work done previous Apr. 20, '08, and not comp'd Apr. 20, '10				200	3,315	16,998	6,439.91	.....			
	Work done from April 20, 1908, to April 20, 1910				11,422 or 2.16 miles.	17,505 or 3.35 miles.	140,494	$41,820.73	.....	.....		{ Aver. price per cu. yd., 19.75 cts.

PLAQUEMINES PARISH EAST BANK LEVEE DISTRICT.

52	Bayou Lamoque	Plaquemines.	Sept. 20, 1909	Mar. 7, 1910	3,635	.....	13,031	$2,143.60	16.45	Mississippi	Riv.	
	Work done from April 20, 1908, to April 20, 1910				3,635 or 0.69 miles.	.....	13,031	$2,143.60	.....			

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
				CADDO LEVEE DISTRICT.							
53	Missionary	Caddo	Sept. 30, 1909		3,362	.....	49,996	$6,049.52	12.10	Red River.	
54	Scott Slough	Caddo	Oct. 15, 1908	May 25, 1909	2,084	.....	59,079	12,406.59	21.	Red River.	
55	Thompson	Caddo	Aug. 11, 1908	Dec. 15, 1908	3,684	.....	48,219	6,099.70	12.65	Red River.	
56	Elmer	Caddo	Aug. 11, 1908	Jan. 19, 1909	2,018	.....	28,770	3,711.33	12.90	Red River.	
57	Glycerine Bayou	Caddo	Oct. 2, 1909	April 11, 1910	2,800	.....	30,872	3,781.82	12.25	Red River.	
58	Crescent	Caddo	Oct. 2, 1909	April 11, 1910	3,605	.....	40,410	5,144.19	12.73	Red River.	
59	Long Point	Caddo	Aug. 11, 1908	Dec. 15, 1908	3,737	.....	51,714	7,188.24	13.90	Red River.	
60	Loggie Lea	Caddo	Aug. 11, 1908	Jan. 19, 1909	4,607	.....	83,704	14,815.61	17.70	Red River.	
61	Upper Cross Keys	Caddo	Oct. 31, 1908	Feb. 18, 1909	2,923	.....	26,897	3,671.44	13.65	Red River.	
	Work done from April 20, 1908, to April 20, 1910				28,820 or 5.46 miles.	.....	419,661	$62,868.44	.....	.....	Aver. price per cu. yd., 14.10 cts.
				BOSSIER LEVEE DISTRICT.							
62	Stinson	Bossier	Aug. 11, 1908	Jan. 28, 1909	4,854	4,160	94,875	$16,128.75	17.	Red River.	
63	Stinson	Bossier	Sept. 30, 1909	Jan. 8, 1910	3,050	.....	56,842	8,355.77	14.7	Red River.	
64	Gold Point Spur	Bossier	Apr. 23, 1909	June 19, 1909	1,528	463	26,461	5,001.13	18.90	Red River.	
65	Riverside	Bossier	Aug. 11, 1909	Jan. 29, 1909	7,978	.....	72,123	9,015.37	12½	Red River.	
66	Gold Dust	Bossier	Sept. 30, 1909	Jan. 14, 1910	5,127	.....	63,177	8,781.60	13.90	Red River.	
67	Buckhorn	Bossier	Sept. 30, 1909	Nov. 22, 1909	2,243	.....	17,487	2,086.20	11.93	Red River.	
	Work done from April 20, 1908, to April 20, 1910				24,780 or 4.70 miles.	4,623 or 0.87 miles.	330,965	$49,368.82	.....	.....	Aver. price per cu. yd., 14.91 cts.

RED RIVER PARISH SUB-LEVEE DISTRICT.

68	Murrell	Red River	Nov. 12, 1908	Oct. 9, 1909	2,300	.....	25,517	$5,345.81	20.95	Red River.	
69	Westdale	Red River	Nov. 12, 1908	Oct. 9, 1909	4,800	.....	23,092	2,713.31	11.75	Red River.	
	Work done from April 20, 1908, to April 20, 1910				7,100 or 1.34 miles.	.....	48,609	$8,059.12	.....	.....	Aver. price per cu. yd., 16.60 cts.

RED RIVER, ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

70	Alexandria Front Sec. No. 2	Rapides	Oct. 31, 1908	Jan. 21, 1909	.....	2,032	19,346	$5,126.69	26.50	Red River.	
71	Alexandria Front Sec. No. 1	Rapides	Oct. 31, 1908	Mar. 18, 1909	.....	4,000	9,803	4,999.53	51.	Red River.	See Dist. Contract.
72	Alexandria Front	Rapides	Sept. 20, 1909	Mar. 19, 1910	2,805	.....	33,958	10,187.40	30.	Red River.	
73	Sunny Home	Rapides	Sept. 20, 1909	Feb. 24, 1910	3,172	.....	64,262	7,968.49	12.40	Red River.	
74	Melville to Latanier	St. Landry	Aug. 19, 1908	.....	.....	20,900	78,512	25,000.03	Sc'le	Atchafalaya Riv	
	Work done from April 20, 1908, to April 20, 1910				5,977 or 1.13 miles.	26,032 or 4.93 miles.	205,881	$53,282.14	.....	.....	Aver. price per cu. yd., 25.88 cts.
	The above is divided by streams as follows:				Miles.						
	Atchafalaya River				.....	3.79	78,512	$25,000.03	.....		
	Red River				1.13	1.14	127,369	28,282.11	.....		
	Totals				1.13	4.93	205,881	$53,282.14	.....		

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
	RED RIVER AND BAYOU DES GLAIZES LEVEE AND DRAINAGE DISTRICT.										
75	Moncla to Edwards..	Avoyelles....	Sept. 24, 1908	May 14, 1909	195	26,308	82,102	$10,000.00	12.18	Red River.	See Dist. Contract.
76	Celestin Moreau.....	Avoyelles....	Dec. 2, 1909	Mar. 1, 1910	1,685	.....	11,783	1,413.96	12.00	Red River.	
77	J. Bettevy.....	Avoyelles....	Dec. 2, 1909	Mar. 1, 1910	1,580	.....	8,395	1,049.37	12½	Red River.	
	Work done from April 20, 1908, to April 20, 1910.....				3,460 or 0.66 miles.	.....	102,280	$12,463.33	.....	.....	Aver. price per cu. yd., 12.18 cts.
	SALINE LEVEE AND DRAINAGE DISTRICT.										
78	Experiment	Avoyelles....	Sept. 24, 1908	Dec. 30, 1908	4,530	.....	69,218	$11,767.06	17.00	Red River.	
79	Coco Point.....	Avoyelles....	Oct. 29, 1909	Mar. 28, 1910	3,940	.....	30,712	4,576.08	14.90	Red River.	
	Work done from April 20, 1908, to April 20, 1910.....				8,470 or 1.60 miles.	.....	99,930	$16,343.14	.....	.....	Aver. price per cu. yd., 16.35 cts.

RECAPITULATION OF WORK DONE FROM APRIL 20, 1908, TO APRIL 29, 1910, AS SHOWN IN THE FOREGOING.

DISTRICT.	Miles		Cubic Yards.	Cost.	REMARKS.
	New Levee.	Enlargement.			
Fifth Louisiana Levee District	2.31	8.81	781,108	$173,884.76	
Atchafalaya Basin Levee District	2.60	0.88	363,052	79,549.85	
Pontchartrain Levee District	1.33	0.98	274,164	61,728.45	
Lafourche Levee District	2.92	0.33	302,340	64,541.06	
Lake Borgne Basin Levee District	1.75	0.75	175,940	34,882.07	
Buras Levee District	1.13	2.42	92,656	38,766.04	
Grande Prairie Levee District	2.16	3.35	140,494	41,820.73	
Plaquemines Parish East Bank Levee District	0.69	....	13,031	2,143.60	
Caddo Levee District	5.46	....	419,661	62,868.44	
Bossier Levee District	4.70	0.87	330,965	49,368.82	
Red River Parish Sub-District	1.34	....	48,609	8,059.12	
Red River Atchafalaya and Bayou Boeuf Levee Dist.	1.13	4.93	205,881	53,282.14	
Red River and Bayou des Glaizes Levee and Drainage District	0.66	4.98	102,280	12,463.33	
Saline Levee and Drainage District	1.60	.....	99,930	16,343.14	
Totals	29.78	28.30	3,350,111	$699,701.55	Average price per cubic yard 20.88 cents

Levee work undertaken by the Board of Commissioners of the Tensas Basin Levee District, under six contracts entered into from April 20, 1908, to April 20, 1910, with four contracts of earlier date not completed April 20, 1908.

Number	Name of Contract.	County	Date of Contract.	Date of Final Certificate.	Linear Ft. New Levee.	Linear Ft. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Chicot Front (650 to 699)	County. Desha, Ark.	Sept. 19, 1906		4,900	.....	342,475	$80,300.28	24.00	Mississippi Riv.	Includes $5,654.16 for drain ditch.
2	Chicot Front Extension	Desha, Ark.	May 11, 1907	Sept. 24, 1908	4,500	.....	186,060	84,235.04	18.40	Mississippi Riv.	
3	Chicot Front to Arkansas City	Desha, Ark.	May 11, 1907	Jan. 29, 1910	.....	11,231	127,904	35,173.60	27.50	Mississippi Riv.	
4	Fulton Lake Enlargement	Desha, Ark.	Feb. 10, 1909		.....	22,000	250,000	67,250.00	26.90	Mississippi Riv.	
5	Gaines Landing	Chicot, Ark.	July 21, 1909	April 4, 1910	4,975	.....	195,140	32,100.53	16.45	Mississippi Riv.	
6	Vaucluse North	Chicot, Ark.	Nov. 9, 1907	Mar. 2, 1909	.....	13,500	121,378	39,690.61	32.7	Mississippi Riv.	
7	Sandy Bayou Dyke and Cypress Slough Dyke	Parish. Caldwell	.....	Sept. 19, 1908	810	.....	14,818	3,200.00	24.75	Ouachita River.	Total cost, $3,667.40, of which the Police Jury pays $467.40.
8	Boeuf River Cut Off No. 1	Morehouse & Richland, La.	Sept. 15, 1909	.....	253	.....	7,131	1,568.82	22.00	Boeuf River.	
9	Boeuf River Cut-Off No. 2	Morehouse, La	Sept. 15, 1909	.....	251	.....	4,013	1,003.25	25.00	Boeuf River.	
10	Boeuf River Cut-Off No. 3	Morehouse, La	Sept. 15, 1909	.....	137	.....	1,491	328.02	22.00	Boeuf River.	
	Totals				15,826	46,731	1,250,410	$294,850.15	.....		
	Less work done previous to Apr. 20, '08, and not comp'd Apr 20, '10.				7,317	22,703	522,798	124,477.60	.....		
	Work done from April 20, 1908, to April 20, 1910				8,509 or 1.61 miles.	24,028 or 4.55 miles.	727,612	$170,372.55	.....		Aver. price per cu. yd., 23.47 cts.
	The above is divided by streams as follows:				Miles.						
	On Mississippi River				1.51	4.55	716,594	168,272.55	.....		
	Ouachita River				0.06	.....	5,218	824.00	.....		
	Boeuf River				0.04	.....	5,800	1,276.00	.....		
	Totals				1.61	4.55	727,612	$170,372.55	.....		

APPENDIX A. STATEMENT NO. 6. LAFOURCHE LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Lafourche Levee District, under sixteen contracts entered into from April 20, 1908, to April 20, 1910, with nine contracts of earlier date not completed April 20, 1908.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Donaldsonville to Co. Canal	.....	June 5, 1906	Dec. 5, 1908	.....	.....	.....	.....	Sc'le	Mississippi Riv.	
	Dugas-Landry	Ascension	.....	.....	1,035	2,375	54,224	$12,396.94	.....	Mississippi Riv.	
2	A. Bend	Ascension	Dec. 17, 1907	Dec. 21, 1908	2,545	.....	103,762	32,166.22	31.00	Mississippi Riv.	
3	A. Bend Extension	Ascension	Sept. 15, 1908	Dec. 21, 1908	1,255	.....	50,514	14,399.73	Sc'le	Mississippi Riv.	
4	St. James Estate	St. James	Aug. 9, 1908	Mar. 8, 1909	1,325	.....	41,125	10,736.44	Sc'le	Mississippi Riv.	
5	Rich Bend	St. James	Nov. 6, 1907	Dec. 5, 1908	2,300	.....	97,851	30,333.81	31.00	Mississippi Riv.	
6	Rich Bend Extension	St. James	Sept. 15, 1908	Dec. 5, 1908	1,125	.....	43,482	12,217.63	Sc'le	Mississippi Riv.	
7	Pikes Peak	St. James	April 9, 1908	Dec. 22, 1908	.....	4,000	25,409	5,896.20	Sc'le	Mississippi Riv.	
8	Evergreen repair	St. John	.....	.....	.....	.....	6,862	2,744.80	40.00	Mississippi Riv.	
9	Dumez & Chauvin	St. John	.....	Dec. 29, 1909	.....	1,200	2,111	633.30	30.00	Mississippi Riv.	
10	Columbia to Tigerv'le	St. John	Sept. 15, 1908	Mar. 2, 1909	.....	10,560	13,421	6,710.50	25.00	Mississippi Riv.	
11	Bonnie Carre to Hymelia	St. John	April 9, 1908	Dec. 22, 1908	.....	6,610	31,164	6,138.24	Sc'le	Mississippi Riv.	
12	Avondale	Jefferson	April 9, 1908	Jan. 22, 1909	1,860	.....	67,053	18,299.43	Sc'le	Mississippi Riv.	
13	White House	Jefferson	Oct. 20, 1908	Feb. 3, 1909	1,435	.....	42,876	11,438.98	Sc'le	Mississippi Riv.	
14	Amesville	Jefferson	Oct. 20, 1908	Feb. 3, 1909	975	.....	26,062	6,539.03	Sc'le	Mississippi Riv.	
15	Harvey Canal to Parish Line	Jefferson	.....	Mar. 6, 1909	.....	7,584	63,270	34,258.00	50 / 75	Mississippi Riv.	$11.85 per lin. ft. Extra work amounting to $177.75 is included in cost.
16	Gretna Box	Jefferson	Nov. 30, 1909	Feb. 2, 1910	767	.....	.....	9,266.30	.....	Mississippi Riv.	
17	Belle Chasse	Plaquemines.	See State Contract.		.....	.....	4,043	1,105.09	.....	Mississippi Riv.	
18	St. Anne Enlargem'nt	Plaquemines.	Nov. 30, 1909	Feb. 9, 1910	.....	4,288	11,361	2,186.99	19¼	Mississippi Riv.	
19	Concession	Plaquemines.	.....	Jan. 22, 1909	.....	5,380	18,888	4,155.36	22.00	Mississippi Riv.	
20	Cedar Grove repair	Plaquemines.	.....	Dec. 21, 1908	.....	4,600	7,533	1,883.25	25.00	Mississippi Riv.	
21	La Reussitte-Alliance (Ollie)	Plaquemines.	June 4, 1907	Nov. 10, 1908	2,500	1,025	46,644	13,993.20	30.00	Mississippi Riv.	
22	La Reussitte-Alliance	Plaquemines.	June 4, 1907	Mar. 5, 1909	7,000	325	112,596	33,778.80	30.00	Mississippi Riv.	
23	Ironton	Plaquemines.	.....	Jan. 22, 1909	.....	2,130	12,605	3,151.25	25.00	Mississippi Riv	
24	Junior	Plaquemines.	.....	Mar. 4, 1909	590	.....	6,654	1,863.12	28.00	Mississippi Riv.	
25	West Pointe a la Hache	Plaquemines.	Nov. 5, 1908	Mar. 2, 1909	1,630	.....	18,331	5,132.68	28.00	Mississippi Riv.	
	Totals				26,342	50,077	907,841	$281,425.29	.....		
	Less work done previous to April 20, 1908				2,195	3,925	50,957	14,101.97	.....		
	Work done from April 20, 1908, to April 20, 1910				24,147 or 4.57 miles.	46,152 or 8.74 miles.	856,884	$267,323.32	.....		Aver. price per cu. yd., 30.11 cts.

APPENDIX A. STATEMENT NO. 4. ATCHAFALAYA BASIN LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Atchafalaya Basin Levee District, under thirteen contracts entered into from April 20, 1908, to April 20, 1910, with three contracts of earlier date not completed April 20, 1908.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Raccourci	Pointe Coupee	See State Co	ntract.	.....	.....	27,939	$6,565.66	.....	Mississippi Riv.	
2	Fleta	Pointe Coupee	Oct. 26, 1908	Feb. 16, 1909	2,013	.....	89,076	19,277.82	21.49	Mississippi Riv.	
3	Upper Morganza	Pointe Coupee	Jan. 29, 1910	.....	5,274	.....	260,000	52,000.00	20.00	Mississippi Riv.	
4	Highland	W. B. Rouge.	Nov. 3, 1909	Mar. 11, 1910	2,160	.....	96,532	15,918.12	16.49	Mississippi Riv.	
5	Hickey	W. B. Rouge.	Feb. 25, 1909	Dec. 2, 1909	.....	3,660	38,320	6,897.60	18.00	Mississippi Riv.	
6	Soniat Ramp	.....	.....	.....	.....	.....	753	135.54	18.00	Mississippi Riv.	
7	Souvenir	Ascension	Oct. 26, 1908	Mar. 3, 1909	2,360	.....	89,620	16,776.86	18.72	Mississippi Riv.	
8	Dameron & White	.....	Jan. 9, 1905	Mar. 2, 1909	.....	.....	.....	.....	Sc'le	Mississippi Riv.	
	Torras Cut	Pointe Coupee	.....	.....	.....	.....	10,341	1,953.34	.....	Mississippi Riv.	
	St. Michael	W. B. Rouge.	.....	.....	1,231	.....	47,671	9,521.90	.....	Mississippi Riv.	
	Chenango	W. B. Rouge.	.....	.....	3,075	.....	295,164	53,510.21	.....	Mississippi Riv.	
	Hope	W. B. Rouge.	.....	.....	2,410	.....	200,723	54,114.91	.....	Mississippi Riv.	
	Australia	W. B. Rouge.	.....	.....	.....	16,144	246,343	56,122.29	.....	Mississippi Riv.	
	Australia repair	W. B. Rouge.	.....	.....	.....	.....	1,188	166.32	.....	Mississippi Riv.	
	Tullier	W. B. Rouge.	.....	.....	740	.....	19,337	3,508.50	.....	Mississippi Riv.	
	Nereaux	W. B. Rouge.	.....	.....	.....	9,300	147,259	33,247.56	.....	Mississippi Riv.	
	Medora	Iberville	.....	.....	616	.....	25,637	5,822.35	.....	Mississippi Riv.	
	Plaquemine	Iberville	.....	.....	308	1,698	21,101	4,642.67	.....	Mississippi Riv.	
	Point Pleasant	Iberville	.....	.....	.....	6,042	38,843	7,944.12	.....	Mississippi Riv.	
	Palo Alto to Bayou Goula	Iberville	.....	.....	.....	5,758	27,907	5,546.24	.....	Mississippi Riv.	
	Lorio	Iberville	.....	.....	.....	4,425	71,748	15,214.10	.....	Mississippi Riv.	
	Bayou Goula No. 2	Iberville	.....	.....	2,214	.....	103,083	23,085.93	.....	Mississippi Riv.	
	Owen	Iberville	.....	.....	.....	9,685	71,748	15,080.59	.....	Mississippi Riv.	
	Nodaway	Iberville	.....	.....	3,490	.....	159,338	35,384.83	.....	Mississippi Riv.	
	White Castle	Iberville	.....	.....	2,237	.....	103,402	23,018.11	.....	Mississippi Riv.	
	Alhambra	Iberville	.....	.....	.....	16,557	110,116	22,753.09	.....	Mississippi Riv.	
	Germania	Iberville	.....	.....	.....	11,828	188,301	43,324.63	.....	Mississippi Riv.	
	Evan Hall	Ascension	.....	.....	.....	3,490	33,581	6,624.49	.....	Mississippi Riv.	
	Smoke Bend	Ascension	.....	.....	.....	4,237	58,381	11,655.65	.....	Mississippi Riv.	
	Upper Smoke Bend	Ascension	.....	.....	873	.....	34,281	7,043.35	.....	Mississippi Riv.	
	Smoke Bend Down	Ascension	.....	.....	.....	612	8,838	1,693.46	.....	Mississippi Riv.	
	Lower Smoke Bend	Ascension	.....	.....	1,080	3,363	65,020	12,296.86	.....	Mississippi Riv.	

9	Barbres to Port Barrow		Sept. 12, 1906	May 15, 1909				21.46	Mississippi Riv.	
	Torras	Pointe Coupee				20,123	244,055	52,374.20	Mississippi Riv.	
	St. Michael	W. B. Rouge.				30,788	507,705	108,953.50	Mississippi Riv.	
	Smoke Bend	Ascension			2,230		67,863	14,563.40	Mississippi Riv.	
	Barbres	Pointe Coupee			1,171	576	25,174	5,402.34	Atchafalaya R.	
	Merrick	Pointe Coupee			2,165		34,121	7,322.35	Atchafalaya R.	
	Merrick to Lucky Hit Enlargement	Pointe Coupee				11,807	98,258	21,086.17	Atchafalaya R.	
	Lucky Hit	Pointe Coupee			4,332		101,399	21,760.22	Atchafalaya R.	
	Gaulden Enl'gement	Pointe Coupee				1,727	14,250	3,058.06	Atchafalaya R.	
	White Hall	Pointe Coupee			1,992		33,439	7,176.00	Atchafalaya R.	
	White Hall Enlargement	Pointe Coupee				7,160	61,774	13,256.71		
10	Alabama Island		Mar. 17, 1908	Oct. 1, 1909				21 & 22.00		
	Catherine Sect.	W. B. Rouge.			1,945		110,998	23,309.58	Mississippi Riv.	
	Cora	Iberville			2,993		139,407	29,275.47	Mississippi Riv.	
	Atchafalaya River Sect.	Pointe Coupee			7,200		108,893	23,956.46	Atchafalaya R.	
11	Milan	Pointe Coupee	Oct. 26, 1908	Feb. 9, 1909	1,378		25,454	4,556.26	17.90 Atchafalaya R.	
12	Burrus	Pointe Coupee	May 9, 1909	July 12, 1909	4,355		146,155	26,307.90	18.00 Atchafalaya R.	
13	Nelson Eddy	Pointe Coupee	Jan. 20, 1909	Aug. 30, 1909	4,910		184,013	47,843.38	26.00 Atchafalaya R.	
14	Latenache	Pointe Coupee	Feb. 15, 1909	May 13, 1909		3,650	30,271	5,445.75	17.99 Atchafalaya R.	
15	Holloway	Pointe Coupee	Feb. 25, 1909	Mar. 7, 1910		4,771	40,446	15,324.99	37.89 Atchafalaya R.	
16	Alabama Bayou-Isl'd.	Pointe Coupee	Sept. 24, 1909		21,000		380,000	157,100.00	38½ Atchafalaya R.	Includes cost of 300,000 ft. B. M. of lumber in timber dam. Aver. price per cu. yd., 21.89 cts.
	Totals				85,752	177,401	4,954,985	$1,158,919.84	...	
	Less work done previous to Apr. 20, '08, and not comp'd Apr. 20, '10				42,239	85,614	2,330,117	584,180.11	...	
	Work done from April 20, 1908, to April 20, 1910				43,513 or 8.24 miles.	91,787 or 17.38 miles.	2,624,868	$574,739.73	...	
	The above is divided by streams as follows:				Miles.					
	On Mississippi River				3.03	11.76	1,721,221	372,243.14	.....	
	Atchafalaya River				5.21	5.62	903,647	202,496.59	.....	
	Totals				8.24	17.38	2,624,868	$574,739.73	.....	

Levee work undertaken by the Board of Commissioners of the Caddo Levee District, under twelve contracts entered into from April 20, 1908, to April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Rattling Slough	Caddo	April 13, 1910		432	4,060	40,000	$7,460.00	18.65	Red River	
2	Coushatta	Caddo	Mar. 24, 1909	June 19, 1909	2,850	.....	48,341	6,743.57	13.95	Red River	
3	Crescent (Woods Place Sec.)	Caddo	Nov. 15, 1909		1,976	.....	15,066	1,917.90	12.73	Red River	
4	Woods Place	Caddo	Aug. 17, 1908	Jan. 19, 1909	2,660	.....	22,762	3,186.68	14.00	Red River	
5	Briarfield	Caddo	Aug. 17, 1908	Jan. 18, 1909	4,112	.....	30,445	4,262.30	14.00	Red River	
6	Cairo	Caddo	Aug. 17, 1908	Mar. 17, 1909	5,238	.....	64,278	10,220.20	15.90	Red River	
7	Gold Point	Caddo	July 15, 1909	Mar. 14, 1910	.....	2,879	8,627	1,242.29	14.40	Red River	
8	Silver Point	Caddo	Aug. 17, 1908	Jan. 17, 1909	2,391	.....	32,342	4,818.96	14.90	Red River	
9	Cash Point Place to Twelve Mile Bayou	Caddo	Mar. 30, 1908	July 24, 1909	16,335	.....	128,514	15,036.14	11.70	Red River	
10	Dixie	Caddo	Aug. 17, 1908	Feb. 6, 1909	2,457	.....	33,137	5,798.97	17.50	Red River	
11	Eagle Bend	Caddo	Mar. 24, 1909	July 13, 1909	3,900	.....	45,285	5,570.06	12.30	Red River	
12	Riverdale	Caddo	Sept. 18, 1908	Feb. 3, 1909	10,117	.....	112,955	20,000.00	17.70	Red River	Contract taken for lump sum of $20,000.
	Totals				52,468	6,939	581,752	$86,257.07	.....		
	Less work not completed April 20, 1910				1,808	4,060	50,666	8,817.78	.....		
	Work done from April 20, 1908, to April 20, 1910				50,660 or 9.60 miles.	2,879 or 0.54 miles.	531,086	$77,439.29	.....		Aver. price per cu. yd., 14.58 cts.

APPENDIX A. STATEMENT NO. 12. BOSSIER LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Bossier Levee District, under ten contracts entered into from April 20, 1908 to April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Gold Point	Bossier	Aug. 18, 1908	Mar. 17, 1909	2,378	.....	19,682	$3,123.43	15.87	Red River	
2	Cash Point	Bossier	Aug. 18, 1908	Jan. 15, 1909	3,190	.....	29,076	4,498.06	15.47	Red River	
3	Arnolds	Bossier	Aug. 18, 1908	Jan. 11, 1909	6,190	.....	61,890	9,407.28	15.20	Red River	
	Colquitt section	Bossier	.....	.....	2,673	.....	11,518	1,750.74			
4	Pat Cash	Bossier	Aug. 18, 1908	Dec. 15, 1908	4,087	.....	25,802	3,519.39	13.64	Red River	
5	Lower Sunflower	Bossier	Aug. 18, 1908	Nov. 9, 1908	3,533	.....	33,089	4,913.72	14.85	Red River	
6	Curtis	Bossier	Aug. 18, 1908	Feb. 4, 1909	4,069	.....	46,968	8,454.24	18.00	Red River	
7	Grappe	Bossier	Sept. 4, 1908	Jan. 19, 1909	5,450	.....	81,623	18,610.04	22.80	Red River	
8	Dortch	Bossier	Aug. 18, 1908	Mar. 17, 1909	2,183	.....	35,925	5,819.85	16.20	Red River	
9	Gold Dust	Bossier	Aug. 18, 1908	Jan. 18, 1909	1,154	.....	11,339	1,802.90	15.90	Red River	
10	China Grove	Bossier	Aug. 18, 1908	Oct. 24, 1908	1,248	.....	6,902	1,014.59	14.70	Red River	
	Work done from April 20, 1908, to April 20, 1910				36,155 or 6.85 miles.	.....	363,814	$62,914.24	.....		Aver. price per cu. yd., 17.29 cts.

APPENDIX A. STATEMENT NO. 7. LAKE BORGNE BASIN LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Lake Borgne Basin Levee District, under two contracts, entered into from April 20, 1908, to April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Scarsdale	Plaquemines	Oct. 26, 1908	Feb. 11, 1909	1 000	.....	19,331	$4,784.42	24 ¾	Mississippi Riv.	
2	Poydras	.....	See State Contract.		.....	.....	.....	3,652.67	18.72	Mississippi Riv.	
	Work done from April 20, 1908, to April 20, 1910				1,000 or 0.19 miles.	.....	19,331	$8,437.09	.....		Aver. price per cu. yd., 25.84 cts.

APPENDIX A. STATEMENT NO. 8. GRANDE PRAIRIE LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Grande Prairie Levee District, under one contract entered into previous to April 20, 1908.

1	Baptiste Collette Cap	Plaquemines	See State Contract.		.....	.....	.....	$1,500.00	....	Mississippi Riv.	Total cu. yds., 39,711; cost, $15,090.18, of which State paid $13,590.18 and Oyster Commission $1,000.00.
	Work done from April 20, 1908, to April 20, 1910				.....	.....	.....	$1,500.00	....		

APPENDIX A. STATEMENT NO. 9. BURAS LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Buras Levee District, under one contract entered into from April 20, 1908, to April 20, 1910.

1	Bellowe	Plaquemines	.....	Jan. 30, 1909	260	.....	968	$193.60	20.00		
	Work done from April 20, 1908, to April 20, 1910				260 or 0.05 miles.	.....	968	$193.60	20.00	Mississippi Riv.	

APPENDIX A. STATEMENT NO. 10 PLAQUEMINES PARISH EAST BANK LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Plaquemines Parish East Bank Levee District, under two contracts entered into previous to and not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF		LINEAR FT.		Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
			Contract.	Final Certificate.	New Levee.	Enlargement.					
1	Gulf Coast Sec. No. 1.	Plaquemines.	Jan. 5, 1906	.....	.....	72,554	231,038	$30,343.19	12.35	Gulf Coast.	Includes cost of 724 stations clearing @ $2.50
2	Gulf Coast Sec. No. 2.	Plaquemines.	Jan. 5, 1906	.....	98,138	.....	670,616	81,920.49	11.85	Gulf Coast.	Includes cost of 981 stations clearing @ $2.50
	Totals				98,138	72,554	901,654	$112,263.68	....		
	Less work done previous to Apr. 20, '08, and not comp'd Apr. 20, '10				58,876	72,554	618,411	74,901.88	.....		
	Work done from April 20, 1908, to April 20, 1910				38,362 or 7.25 miles.	.....	283,243	$37,361.80	.....		Aver. price per cu. yd., 11.85 cts.

Levee work undertaken by the Board of Commissioners of the Caddo Levee District, under twelve contracts entered into from April 20, 1908, to April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Rattling Slough	Caddo	April 13, 1910		432	4,060	40,000	$7,460.00	18.65	Red River	
2	Coushatta	Caddo	Mar. 24, 1909	June 19, 1909	2,850		48,341	6,743.57	13.95	Red River	
3	Crescent (Woods Place Sec.)	Caddo	Nov. 15, 1909		1,976		15,066	1,917.90	12.73	Red River Red River	
4	Woods Place	Caddo	Aug. 17, 1908	Jan. 19, 1909	2,660		22,762	3,186.68	14.00	Red River	
5	Briarfield	Caddo	Aug. 17, 1908	Jan. 18, 1909	4,112		30,445	4,262.30	14.00	Red River	
6	Cairo	Caddo	Aug. 17, 1908	Mar. 17, 1909	5,238		64,278	10,220.20	15.90	Red River	
7	Gold Point	Caddo	July 15, 1909	Mar. 14, 1910		2,879	8,627	1,242.29	14.40	Red River	
8	Silver Point	Caddo	Aug. 17, 1908	Jan. 17, 1909	2,391		32,342	4,818.96	14.90	Red River	
9	Cash Point Place to Twelve Mile Bayou	Caddo	Mar. 30, 1908	July 24, 1909	16,335		128,514	15,036.14	11.70	Red River	
10	Dixie	Caddo	Aug. 17, 1908	Feb. 6, 1909	2,457		33,137	5,798.97	17.50	Red River	
11	Eagle Bend	Caddo	Mar. 24, 1909	July 13, 1909	3,900		45,285	5,570.06	12.30	Red River	
12	Riverdale	Caddo	Sept. 18, 1908	Feb. 3, 1909	10,117		112,955	20,000.00	17.70	Red River	Contract taken for lump sum of $20,000.
	Totals				52,468	6,939	581,752	$86,257.07			
	Less work not completed April 20, 1910				1,808	4,060	50,666	8,817.78			
	Work done from April 20, 1908, to April 20, 1910				50,660 or 9.60 miles.	2,879 or 0.54 miles.	531,086	$77,439.29			Aver. price per cu. yd., 14.58 cts.

Levee work undertaken by the Board of Commissioners of the Bossier Levee District, under ten contracts entered into from April 20, 1908 to April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Gold Point	Bossier	Aug. 18, 1908	Mar. 17, 1909	2,378	.....	19,682	$3,123.43	15.87	Red River	
2	Cash Point	Bossier	Aug. 18, 1908	Jan. 15, 1909	3,190	.....	29,076	4,498.06	15.47	Red River	
3	Arnolds	Bossier	Aug. 18, 1908	Jan. 11, 1909	6,190	.....	61,890	9,407.28	15.20	Red River	
	Colquitt section	Bossier	.....	.....	2,673	.....	11,518	1,750.74			
4	Pat Cash	Bossier	Aug. 18, 1908	Dec. 15, 1908	4,087	.....	25,802	3,519.39	13.64	Red River	
5	Lower Sunflower	Bossier	Aug. 18, 1908	Nov. 9, 1908	3,533	.....	33,089	4,913.72	14.85	Red River	
6	Curtis	Bossier	Aug. 18, 1908	Feb. 4, 1909	4,069	.....	46,968	8,454.24	18.00	Red River	
7	Grappe	Bossier	Sept. 4, 1908	Jan. 19, 1909	5,450	.....	81,623	18,610.04	22.80	Red River	
8	Dortch	Bossier	Aug. 18, 1908	Mar. 17, 1909	2,183	.....	35,925	5,819.85	16.20	Red River	
9	Gold Dust	Bossier	Aug. 18, 1908	Jan. 18, 1909	1,154	.....	11,339	1,802.90	15.99	Red River	
10	China Grove	Bossier	Aug. 18, 1908	Oct. 24, 1908	1,248	.....	6,902	1,014.59	14.70	Red River	
	Work done from April 20, 1908, to April 20, 1910				36,155 or 6.85 miles.	.....	363,814	$62,914.24	.....		Aver. price per cu. yd., 17.29 cts.

APPENDIX A. STATEMENT NO. 13. RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Boeuf Levee District, under six contracts entered into from April 20, 1908, to April 20, 1910, with one contract of previous date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Alexandria Front Sec. No. 1	Rapides	See State Contract:		.....	.....	30,768	$10,692.15	.....	Red River	Total cu. yds., 40,571; cost, $15,691.68, of which State paid 4,999.53.
2	B. T. Lewis	Rapides	Jan. 15, 1909	April 9, 1909	2,040	.....	33,133	3,953.36	11.93	Red River	
3	Egg Bend to Choctaw Bayou	Avoyelles	Aug. 25, 1908	May 14, 1909	5,847	19,150	264,943	45,649.68	17.23	Red River	
4	Choctaw Bayou to Moncla	Avoyelles	Aug. 25, 1908	May 14, 1909	4,960	13,240	149,006	18,923.76	12.70	Red River	
5	Odenberg	Avoyelles	Nov. 5, 1908	Mar. 16, 1909	1,219	.....	24,481	3,402.86	13.90	Atchafalaya R.	
6	Scotland	St. Landry	Nov. 5, 1908	Apr. 16, 1909	3,305	.....	44,833	5,321.68	11.87	Atchafalaya R.	
7	Melville to Lutanier	St. Landry	See State Contract.		.....	23,950	114,000	34,200.00	Sc'le	Atchafalaya R.	
	Totals				17,371	56,340	661,169	$122,143.49	.....		
	Less work not completed April 20, 1910				.....	9,500	38,761	11,628.30	.....		
	Work done from April 20, 1908, to April 20, 1910				17,371 or 3.29 miles.	46,840 or 8.87 miles.	622,408	$110,515.19	.....		Aver. price per cu. yd., 17.76 cts.
	The above is divided by streams as follows:				—Miles.—						
	Atchafalaya River				0.86	2.74	144,553	31,296.24	.....		
	Red River				2.43	6.13	477,855	79,218.95	.....		
	Totals				3.29	8.87	622,408	$110,515.19	.....		

The Board of State Engineers is indebted to the Orleans Levee Board for the following statement of work undertaken by the Board of Levee Commissioners, under twenty-one contracts, entered into from April 20, 1908, to April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement of Levee.	Cubic Yards.	Price—Cents.	Cost.	Revetment, Linear Feet.	Feet B. M.	Price Per M. Feet B. M.	Cost of Woodwork.	Allowed on Claims, etc.	Total Cost.
1	Placing filling, Commercial Front, 4th District	ORLEANS	Apr. 14, 1908	June 4, 1908	....	....	2,350.4	50	$1,175.20	.....	.....	.....	.....	.....	$1,175.20
2	Placing earth on river front between St. Andrew and Celeste.....		Feb. 29, 1908	Apr. 23, 1908	....	....	976.3	50	488.15	.....	.....	.....	.....	.....	488.15
3	Placing earth on river front, 4th District....		Mar. 17, 1908	Sept. 19, 1908	....	....	12,180.8	65	7,917.55	.....	.....	.....	.....	.....	7,917.55
4	Building ramps.....		June 4, 1908	Aug. 24, 1908	....	....	3,085.0	65	2,005.23	.....	.....	.....	.....	.....	2,005.23
5	New levee & revetment, Louisa to Desire St...		Sept. 14, 1908	Mar. 15, 1909	653	....	45,653.4	90	41,088.06	653	33,537	$70.00	$2,347.59	.....	43,435.65
6	New levee & revetment, Mazant to Poland St....		Sept. 14, 1908	Feb. 5, 1909	1,147	....	77,308.1	90	69,577.30	1,205	64,480	70.00	4,513.60	$1,236.51	75,327.41
7	New levee, Jackson Ave. to Third Street.....		Sept. 14, 1908	Mar. 15, 1909	3,171	....	37,824.6	90	34,042.11	.....	.....	.....	.....	209.83	34,251.94
8	New levee, Seventh to Louisiana Ave.....		Sept. 14, 1908	Mar. 4, 1909	2,034	....	57,775.5	90	51,997.95	.....	.....	.....	.....	939.52	52,937.48
9	Removal of skeleton wharf and pile bulkhead		Feb. 26, 1908	Sept. 26, 1908	Removing 3,905 piles at $4.20 per pile.				.....	.....	.....	.....	.....	.....	16,401.00
10	Removal of skeleton wharf and pile bulkhead		Sept. 30, 1908	Feb. 25, 1909	Removing 3,514 piles at $2.90 per pile.....				.....	.....	.....	.....	.....	.....	10,190.60
11	Upper Stanton new levee		Nov. 4, 1908	Feb. ,9 1909	1,496	....	40,682.8	25.4	10,333.43	.....	.....	.....	.....	.....	10,333.43

APPENDIX A. STATEMENT NO. 16. RED RIVER, ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

Drainage work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Bœuf Levee District, under one contract entered into from April 20, 1908, to April 20, 1910, and one contract of earlier date not completed April 20, 1908.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	Linear Feet Excavation.	Miles Clearing.	Cubic Yards.	Cost.	Price—Cents.		REMARKS.
1	Swaze Lake to Bayou Courtableau	St. Landry...	Dec. 3, 1906	.....	103,700	21.00	447,587	$128,756.14	17.98		Includes $48,300 for clearing.
2	Bayou Big Jack Section	St. Landry...	Mar. 24, 1910	.....	4,750	1.41	40,000	5,643.00	12.00		
	Totals				108,450	22.41	487,587	$134,399.14	.....		Includes $843 for clearing.
	Less work done previous Apr. 20, '08, and not comp'd Apr. 20, '10.				30,100	11.47	150,100	48,576.98	.....		
	Work done from April 20, 1908, to April 20, 1910				78,350 or 14.84 miles.	10.94	337,487	$85,822.16	.....		Aver. price per cu. yd., 10.87 cts.

APPENDIX A. STATEMENT NO. 17. JOINT ORGANIZATION ATCHAFALAYA BASIN AND LAFOURCHE LEVEE DISTRICTS.

Work for improvement of Bayou Lafourche undertaken by the Board of Commissioners of the Atchafalaya Basin and the Lafourche Levee Districts, under two contracts of earlier date than April 20, 1908, and not completed by that date.

1	Cancienne Canal "A".	Assumption..	Dec. 17, 1907	July 23, 1909	8,465	.....	310,744.	$54,069.45	17.40		
2	Cancienne Canal....	Assumption..	Sept. 30, 1907	.....	7,325	.....	200,000	30,000.00	15.00		
	Totals				15,790	.....	510,744	$84,069.45	.....		
	Less work done previous Apr. 20, '08, and not comp'd Apr. 20, '10.				3,425	.....	80,480	12,989.76	.....		
	Work done from April 20, 1908, to April 20, 1910				12,365 or 2.36 miles.	.....	430,264	$71,079.69	.....		Aver. price per cu. yd., 16.52 cts.

The Board of State Engineers is indebted to the Orleans Levee Board for the following statement of work undertaken by the Board of Levee Commissioners, under twenty-one contracts, entered into from April 20, 1908, to April 20, 1910.

Number	Name of Contract.	Parish.	Date of Contract.	Date of Final Certificate.	Linear Ft. New Levee.	Linear Ft. Enlargement of Levee.	Cubic Yards.	Price—Cents.	Cost.	Revetment. Linear Feet.	Feet B. M.	Price Per M. Feet B. M.	Cost of Woodwork.	Allowed on Claims, etc.	Total Cost.
1	Placing filling, Commercial Front, 4th District	Orleans	Apr. 14, 1908	June 4, 1908	....	....	2,350.4	50	$1,175.20	.....	.....	.....	.....	.....	$1,175.20
2	Placing earth on river front between St. Andrew and Celeste.....		Feb. 29, 1908	Apr. 23, 1908	....	....	976.3	50	488.15	.....	.....	.....	.....	.....	488.15
3	Placing earth on river front, 4th District....		Mar. 17, 1908	Sept. 19, 1908	....	....	12,180.8	65	7,917.55	.....	.....	.....	.....	.....	7,917.55
4	Building ramps.....		June 4, 1908	Aug. 24, 1908	....	....	3,085.0	65	2,005.23	.....	.....	.....	.....	.....	2,005.23
5	New levee & revetment, Louisa to Desire St...		Sept. 14, 1908	Mar. 15, 1909	653	....	45,653.4	90	41,088.06	653	33,537	$70.00	$2,347.59	.....	43,435.65
6	New levee & revetment, Mazant to Poland St....		Sept. 14, 1908	Feb. 5, 1909	1,147	....	77,308.1	90	69,577.30	1,205	64,480	70.00	4,513.60	$1,236.51	75,327.41
7	New levee, Jackson Ave. to Third Street.....		Sept. 14, 1908	Mar. 15, 1909	3,171	....	37,824.6	90	34,042.11	.....	.....	.....	.....	209.83	34,251.94
8	New levee, Seventh to Louisiana Ave.....		Sept. 14, 1908	Mar. 4, 1909	2,034	....	57,775.5	90	51,997.95	.....	.....	.....	.....	939.52	52,937.48
9	Removal of skeleton wharf and pile bulkhead		Feb. 26, 1908	Sept. 26, 1908	Removing 3,905 piles at $4.20 per pile.										16,401.00
10	Removal of skeleton wharf and pile bulkhead		Sept. 30, 1908	Feb. 25, 1909	Removing 3,514 piles at $2.90 per pile.....										10,190.60
11	Upper Stanton new levee		Nov. 4, 1908	Feb. ,9 1909	1,496	....	40,682.8	25.4	10,333.43	.....	.....	.....	.....	.....	10,333.43

Number	Name of Contract.	Parish	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement of Levee.	Cubic Yards.	Price—Cents.	Cost.	Revetment. Linear Feet.	Feet B. M.	Price Per M. Feet B. M.	Cost of Woodwork.	Allowed on Claims, etc.	Total Cost.
12	New levee, Alabo to St. Maurice	ORLEANS	Nov. 12, 1908	Feb. 15, 1909	640	....	14,583.8	$1.15	16,771.36	.....	.....	.....	.....	300.00	17,071.36
13	Levee improvement, Julia to Lafayette street		Sept. 13, 1908	Dec. 19, 1908	....	1,049	1,236.0	45	556.20	.....	.....	.....	.....	.....	556.20
14	Revetment, Beka new levee		Nov. 27, 1908	Jan. 30, 1909	....	....	.....	.....	.....	7,810 2	245,074	28.75	7,045.88	.....	7,045.88
15	Metairie Road to West End		Mar. 29, 1909	Abandoned.	14,494	....	76,024.7	31	20,629.39	.....	.....	.....	.....	1,172.86	21,802.25
16	Banquette to Beka N. L.		June 19, 1908	Sept. 17, 1908	....	5,000	6,956.2	19	1,321.68	.....	.....	.....	.....	66.50	1,388.18
17	Carrollton Reach levee and revetment		July 23, 1909	Not compl't'd.	10,382	....	236,784.7	33.33	63,136.28	5,698	163,154	61.25	7,994.54	.....	71,130.82
18	Emergency pumping of banks		Aug. 21, 1909	Sept. 17, 1909	126 hours at $2.50 per hour.										315.00
19	Placing earth behind bulkhead Canal to Lafayette		Oct. 20, 1909	Jan. 14, 1910	....	999	3,593.7	25	898.42	.....	.....	.....	.....	.....	898.42
20	Metairie Road to West End levee		Dec. 9, 1909	Mar. 31, 1910	....	12,094	43,660.3	74	32,308.61	.....	.....	.....	.....	.....	32,308.61
21	Commercial front Girod St. to St. Mary		Jan. 13, 1910	Apr. 8, 1910	....	....	2,408.0	35	842.80	.....	.....	.....	.....	.....	842.80
	Beka crevasse		.....	.....							.....	.....	.....	.....	44,483.27
	Bayou St. John crevasse		.....	.....							.....	.....	.....	.....	544.82
	Totals		.....	.....	34,017	19,142	663,084.3	.....	$355,089.72	15,366.2	506,245	.....	$21,901.61	$3,925.22	$452,851.25

The following contracts, reported not completed in the last biennial report, have since been completed.

Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement of Levee.	Cubic Yards.	Price—Cents.	Cost.	Revetment, Linear Feet.	Feet B. M.	Price Per M. Feet B. M.	Cost of Woodwork.	Allowed on Claims, etc.	Total Cost.
Seventh St. to Third St. new levee	ORLEANS	Aug. 30, 1907	Jan. 21, 1909	1,475	....	74,732.7	97½	$72,864.36	.....	.....	.....	.....	$2,224.90	$75,089.26
New levee, Elmira to Mazant St		Aug. 30, 1907	Jan. 21, 1909	2,016	....	133,531.2	94½	112,263.40	2,016	110,796	$70.00	$7,755.72	3,131.22	123,150.34
				....	....	.....	41½	.....	.....	.....	.....	.....	*8,750.00	8,750.00
Beka Plantation, new levee Lower Delacroix to Upper Beka Plantation, new levee and revetment		Oct. 14, 1907	Dec. 28, 1909	7,745	....	127,374.1	29.45	37,511.67	.....	.....	.....	.....	175.00	37,686.67
		Oct. 14, 1907	Feb. 3, 1909	3,409	....	65,823.5	23	15,139.40	3,440	170,703	85.00	14,509.76	2,408.17	32,057.33
Filling behind wharf, St. Andrew to Jackson Ave.		Nov. 5, 1907	Apr. 23, 1908	....	900	9,149.5	65	5,947.18	.....	.....	.....	.....	.....	5,947.18
Totals		.....	.....	14,645	900	410,611.0	.....	$243,726.01	5,456	281,499	.....	$22,265.48	$16,689.29	$282,680.78
Previously reported		.....	.....	....	....	154,022.9	.....	102,526.94	.....	35,000	.....	2,975.00	.....	105,501.94
Period April 20, 1908, to April 20, 1910		.....	.....	....	....	256,588.1	.....	$141,199.07	.....	246,499	.....	$19,290.48	$16,689.29	$177,178.84

*Amount of claims allowed by Levee Board on Seventh Street to Third Street New Levee and New Levee, Elmira to Mazant Street.

Recapitulation of work done from April 20, 1908, to April 20, 1910, as shown in the foregoing

DISTRICT.	MILES. New Levee.	MILES. Enlargement.	Cubic Yards.	Cost.	REMARKS.
Tensas Basin	1.61	4.55	727,612	$170,372.55	
Fifth Louisiana	3.75	15.47	1,294,491	313,173.16	
Atchafalaya Basin	8.24	17.38	2,624,868	574,739.73	
Pontchartrain	3.13	0.14	591,188	117,636.50	
Lafourche	4.57	8.74	856,884	267,323.32	
Orleans	11.99	1.67	919,672	630,030.09	
Lake Borgne Basin	0.19	.....	19,331	8,437.09	
Grand Prairie	.....	.....	.....	1,500.00	
Buras	0.05	.....	968	193.60	
Plaquemines Parish, East Bank	7.25	.....	283,243	37,361.80	
Caddo	9.60	0.54	531,086	77,439.29	
Bossier	6.85	.....	363,614	62,914.24	
Red River, Atchafalaya and Bayou Boeuf	3.29	8.87	622,408	110,515.19	
Red River and Bayou des Glaizes	3.08	.....	338,271	47,878.58	
Saline	0.65	.....	44,032	10,662.76	
Totals	64.25	57.36	9,217,868	$2,430,077.90	Average price per cubic yard, 26.36 cents.

DRAINAGE.	MILES. Excavation.	MILES. Clearing.			
Red River, Atchafalaya and Bayou Boeuf Levee District	14.84	10.94	337,487	$85,822.16	

IMPROVING BAYOU LAFOURCHE.	MILES. Excavation.	MILES. Clearing.			
Atchafalaya Basin and Lafourche Levee District	2.35	.....	430,264	$71,079.69	

APPENDIX A. STATEMENT NO. 20.

Tabulated statement showing number of cubic yards and cost involved in 43 contracts (District and State) entered into previous to April 20, 1908, and not completed, with 192 contracts entered into between April 20, 1908, and April 20, 1910, divided into accounts showing work done under all; that is, previous to April 20, 1908, between April 20, 1908, and April 20, 1910, and still remaining to be done under existing contracts, April 20, 1910.

DISTRICT.	Work Done Previous to April 20, 1908.		Work Done from April 20, 1908, to April 20, 1910.		Work Remaining to be Done Under Existing Contracts.		Total Amounts Involved in Contracts.	
	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.
				DISTRICT.				
Tensas Basin	263,988	$ 55,280.53	727,612	$ 170,372.53	258,810	$ 69,197.07	1,250,410	$ 294,850.15
Fifth Louisiana	32,000	10,747.58	1,294,491	313,173.16	74,139	24,334.22	1,400,630	384,254.96
Atchafalaya Basin	1,717,217	380,500.11	2,624,868	574,739.73	612,900	203,680.00	4,954,985	1,158,919.84
Pontchartrain	159,990	36,249.20	591,188	117,536.50	72,042	11,116.08	823,220	164,901.78
Lafourche	50,957	14,101.97	856,884	267,323.32	.....	.....	907,841	281,425.29
Orleans	.....	.....	919,672	630,030.09	.....	.....	919,672	630,030.09
Lake Borgne Basin	.....	.....	19,331	8,437.09	.....	.....	19,331	8,437.09
Grande Prairie	.....	.....	.....	1,500.00	.....	.....	.....	1,500.00
Buras	.....	.....	968	193.60	.....	.....	968	193.60
Plaquemines Parish East Bank	423,395	51,387.49	283,243	37,361.80	195,016	23,514.39	901,654	112,263.68
Caddo	.....	.....	531,086	77,439.29	50,666	8,817.78	581,752	86,257.07
Bossier	.....	.....	363,814	62,914.24	.....	.....	363,814	62,914.24
Red River, Atchafalaya and Bayou Boeuf	.....	.....	622,408	110,515.19	38,761	11,628.30	661,169	122,143.49
Red River and Bayou des Glaizes	807,100	118,885.83	338,271	47,878.58	350,000	87,500.00	1,495,371	254,264.41
Saline	.....	.....	44,032	10,662.76	.....	.....	44,032	10,662.76
Totals	3,454,647	$667,152.71	9,217,868	$2,430,077.99	1,652,334	$ 439,787.84	14,324,849	$ 3,537,018.45

STATEMENT NO. 20—Continued.

DISTRICT.	Work Done Previous to April 20, 1908.		Work Done from April 20, 1908, to April 20, 1910.		Work Remaining to be Done Under Existing Contracts.		Total Amounts Involved in Contracts.	
	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.
				STATE.				
Fifth Louisiana	227,671	$ 49,198.05	781,108	$ 173,884.76	533,889	$ 114,896.56	1,542,668	$ 337,979.37
Atchafalaya Basin	175,851	41,325.00	363,052	79,549.85	.....	.....	538,903	120,874.85
Pontchartrain	119,400	24,009.91	274,164	61,728.45	50,227	7,986.09	443,791	93,724.45
Lafourche	13,619	4,902.84	302,340	64,541.06	7,258	1,807.24	323,217	71,251.14
Lake Borgne Basin	46,841	11,362.87	175,940	34,882.07	.....	.....	222,781	46,244.94
Buras	10,688	4,884.43	92,656	38,766.04	.....	.....	103,344	43,650.47
Grande Prairie	9,721	5,421.86	140,494	41,820.73	7,277	1,018.05	157,492	48,260.64
Plaquemines Parish East Bank	.....	.....	13,031	2,143.60	.....	.....	13,031	2,143.60
Caddo	.....	.....	419,661	62,868.44	.....	.....	419,661	62,868.44
Bossier	.....	.....	330,965	49,368.82	.....	.....	330,965	49,368.82
Red River Parish Sub	.....	.....	48,609	8,059.12	.....	.....	48,609	8,059.12
Red River, Atchafalaya and Bayou Boeuf	.....	.....	205,881	53,282.14	.....	.....	205,881	53,282.15
Red River and Bayou des Glaizes	.....	.....	102,280	12,463.33	.....	.....	102,280	12,463.33
Saline	.....	.....	99,930	16,343.14	.....	.....	99,930	16,343.14
Totals	603,791	$141,104.96	3,350,111	$ 699,701.55	598,651	$ 125,707.94	4,552,553	$ 966,514.45
				SUMMARY.				
Districts	3,454,647	$667,152.71	9,217,868	$ 2,430,077.90	1,652,334	$ 439,787.84	14,324,849	$ 3,537,018.45
State	603,791	141,104.96	3,350,111	699,701.55	598,651	125,707.94	4,552,553	966,514.45
Totals	4,058,438	$808,257.67	12,567,979	$ 3,129,779.45	2,250,985	$ 565,495.78	18,877,402	$ 4,503,532.90

The Board of State Engineers is indebted to the courtesy of Captain Clarke S. Smith, Corps of Engineers, U. S. A., for the following statements of levees built and enlarged and revetment built and maintained for levee protection by the United States in the Upper Tensas District in Arkansas and Louisiana, from April 20, 1908, to April 20, 1910.

NAME OF CONTRACT.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Total Cost	Price	Streams.	REMARKS.
In Arkansas.											
662-697	Desha Co...	Aug. 20, '07	May 18, '08	3,500	.....	11,903	$ 2.261.57	.....	19.0	Arkansas Riv.	
778-871	Desha Co...	Oct. 17, '07	Nov. 12, '09	9,300	.....	70,571	20.818.46	.....	29. 0	Arkansas Riv.	
871-916	Desha Co...	Nov. 20, '07	.....	4,500	.....	20,189	5,249.14	.....	26.0	Arkansas Riv.	Con't annulled, relet Sept.28, '09
360-390	Desha Co...	May 27, '07	.....	.....	3,000	29,253	9.653.49	.....	33.0	Mississippi Riv.	Not Completed
560-620	Desha Co...	May 27, '07	Nov. 5, '09	.....	6,000	67,736	22,352.88	.....	33.0	Mississippi Riv.	
1240-1360	Desha Co...	July 17, '09	.....	.....	12,000	64,671	11,957.68	.....	18.49	Mississippi Riv.	Not Completed
1360-1490	Chicot Co...	July 17, '09	Dec. 29, '09	.....	13,000	83,155	13,595.84	.....	16.35	Mississippi Riv.	
1720-1790	Chicot Co...	Oct. 25, '06	Dec. 1, '08	.....	7,000	50,748	17,355.82	.....	34.20	Mississippi Riv.	
1783-Spur	Chicot Co...	Aug. 7, '08	Sept. 7, '08	450	.....	12,292	3,411.03	.....	27.75	Mississippi Riv.	
1790-1854	Chicot Co...	June 1. '07	Nov. 7, '08	.....	6,400	30,861	7,684.39	.....	24.90	Mississippi Riv.	
1910-1941	Chicot Co...	May 27, '07	March 4, '09	.....	3,100	30,627	8,575.56	.....	28.00	Mississippi Riv.	
1941-2050	Chicot Co...	July 29, '09	.....	.....	10,900	19,909	3,961.89	.....	19.90	Mississippi Riv.	Not Completed
2050-2155	Chicot Co...	Aug. 20, '08	Nov. 27, '09	.....	10,500	117,310	32,494.87	.....	27.70	Mississippi Riv.	
3460-3530	Chicot Co...	Nov. 27, '07	Jan. 9, '10	.....	7,000	104,801	29,868.29	.....	28.50	Mississippi Riv.	
3560-3640	Chicot Co...	Nov. 20, '07	Dec. 26, '08	.....	8,000	82,648	22,324.68	.....	27.00	Mississippi Riv.	
Totals in Arkansas.	.....	.....	.....	17,750 or 3.36 miles	86,900 or 16.46 miles	796,710	$211,565.58	$211,565.58	Average price per		cu. yd. 26.55c.
In Louisiana.											
3407-3428	Madison ...	July 16, '09	March 1, '10	2,100	.....	88,263	18,535.23	.....	21.00	Mississippi Riv.	
3428-3448	Madison ...	July 16, '09	March 1, '10	2,000	.....	105,338	22,120.98	.....	21.00	Mississippi Riv.	
3448-3473	Madison ...	July 16, '09	Feb. 23, '10	2,500	.....	118,434	24,871.14	.....	21.00	Mississippi Riv.	
Totals in Louisiana	.....	.....	.....	6,600 or 1.25 miles	.....	312,035	$ 65,527.35	$ 65,527.35	Average price per		cu. yd. 21c.

REVETMENT.

NAME OF REVETMENT	Parish.	Total Length		Expended During Period		TOTAL.
		Proposed Feet	Constructed Feet	For New Revetment	For Repairs	
Red Fork (Arkansas River)	Desha Co...	1,100	4,100	$14,385.17	.....	.....
Panther Forest	Chicot Co...	*4,000	†2,400	65,703.11	.....	.....
Leland Neck	Chicot Co...		†3,100	96,393.61	.....	.....
Vaucluse	Chicot Co...	*4,000	†2,000	61,995.58	.....	.....
Lake Providence	E. Carroll..	12,600	12,600		$10,469.22	
Reid-Bedford	Madison ...	*6,000	†2,500		118,449.76	
	Grand Total	27,700	23,700 or 4.49 miles			$367,396.45

*Approximate. †Not complete.

Warrenton, Miss., to Head of Passes, Louisiana, from April 20, 1908, to April 20, 1910.

Name of Contract.	Sections.	Miles Below Cairo.		DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.
LOWER TENSAS DISTRICT.									
Hulse	1—6	623	R	Nov. 11, 1908	April 1, 1910	.....	5,657	82,731.29	19,359.12
Hewitt	1—6	623.5	R	Nov. 11, 1908	April 1, 1910	.....	5,000	75,460.07	17,657.64
Limerick	1—6	624	R	Nov. 11, 1908	April 1, 1910	.....	6,300	74,652.70	17,468.73
Aurora	1—6	624.5	R	Nov. 11, 1908	July 24, 1909	.....	6,100	73,811.18	17,271.82
Burn	1—6	625	R	Nov. 11, 1908	Nov. 10, 1909	.....	5,700	70,458.29	16,487.25
Hard Times, Lot 1	1—6	638	R	May 13, 1908	Jan. 29, 1910	1,300	.....	74,275.80	11,884.14
Lot 2	1—6	638	R	May 13, 1908	April 24, 1909	1,800	.....	82,003.89	13,120.64
Lot 3	1—6	638	R	May 13, 1908	April 9, 1909	2,100	.....	72,846.19	11,655.24
Lot 4	1—6	638	R	May 13, 1908	Jan. 30, 1910	1,100	.....	71,015.01	11,362.40
Horner	1—6	638	R	Sept. 18, 1908	Sept. 6, 1909	1,233	.....	70,113.96	17,318.14
Ashley	1—8	724	R	Dec. 31, 1907	Feb. 15, 1910	.....	13,175	99,848.57	19,969.68
Glasscock	1—8	725	R	Dec. 31, 1907	Nov. 25, 1909	.....	8,309	100,754.74	27,103.02
Ardee	1—8	726	R	Dec. 31, 1907	Jan. 21, 1910	.....	6,904	104,614.97	21,969.14
Roseland	1—8	727	R	Dec. 31, 1907	Jan. 28, 1910	.....	9,337	99,416.59	16,851.11
Bougere, Lot 11	2—5	739.5	R	June 21, 1907	Oct. 8, 1909	900	.....	47,216.67	17,460.72
Lot 15	1—5	739.5	R	June 21, 1907	Nov. 19, 1909	1,000	.....	59,877.53	22,142.71
Lot 16	1—5	739.5	R	June 21, 1907	Jan. 5, 1910	900	.....	55,593.26	20,558.88
Lot 17	1—5	739.5	R	June 21, 1907	Feb. 1, 1910	800	.....	50,172.43	18,553.76
Lot 18	1—5	739.5	R	June 21, 1907	Feb. 1, 1910	800	.....	55,594.58	20,558.88
Lot 19	1—5	739.5	R	June 21, 1907	Jan. 14, 1910	800	.....	62,325.36	23,047.91
Lot 20	1—5	739.5	R	June 21, 1907	Feb. 5, 1910	800	.....	59,067.15	21,843.03
Lot 12	1—8	739.5	R	Aug. 29, 1906	Nov. 15, 1909	1,500	.....	110,673.40	40,395.80
Lot 13	5—8	739.5	R	Aug. 29, 1906	Nov. 20, 1909	900	.....	63,178.02	23,059.98
Lot 14	1—6 & 8	740	R	Aug. 29, 1906	Dec. 8, 1909	1,600	.....	92,988.80	33,940.91
Lot 3	1—3	740	R	Aug. 30, 1905	Oct. 7, 1909	900	.....	49,947.22	16,649.07
Lot 4	8	740	R	Aug. 30, 1905	Jan. 25, 1909	300	.....	17,852.72	5,950.91
Totals	.....	.....		.....	.....	18,733 or 3.55 miles	66,482 or 12.59 miles	1,876,489.39	$502,640.14
ATCHAFALAYA BASIN LEVEE DISTRICT.									
New Texas	1 & 3—13	788	R	Dec. 31, 1907	Oct. 2, 1908	2,922	.....	159,489.06	36,682.48
Plaquemine	.....	854	R	Dec. 18, 1908	Feb. 6, 1909	594	.....	12,612.06	2,224.71
Totals	.....	.....		.....	.....	3,516 or 0.67 miles	.....	172,101.12	38,907.19

Name of Contract.	Sections.	Miles Below Cairo.		DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.
BARATARIA LEVEE DISTRICT.									
Point Celeste		1008	R	Built by U. S. Machine	Feb. 2, 1910	1,722	1,820	25,503.85	$ 3,589.16
Oakville	3	993	R	Sept. 19, 1905	Sept. 1, 1908	.....	2,500	13,459.05	2,341.87
Magnolia	2 & 3	1014	R	Sept. 19, 1905	Nov. 30, 1908	.....	5,800	23,353.56	4,133.58
Orange Farm		1023	R	Built by U. S. Machine	March 2, 1909	5,930	5,231	90,015.00	11,021.70
Riceland		1015	R	..... do	Dec. 11, 1909	2,737	.....	43,546.00	5,901.57
Cognevich		1026	R	Oct. 8, 1909	Nov. 22, 1909	.....	1,720	6,431.97	1,247.80
Totals						10,389 or 1.97 miles.	17,071 or 3.23 miles.	202,309.42	$ 28,235.67
LEVEE REVETMENTS.									
					Completed	Linear feet.		Cost.	
Orange Farm		1023	R	Concrete	March 17, 1909	2,700		$ 6,093.50	
Orange Farm		1023	R	Wooden	March 17, 1909	3,440		2,879.89	
Point Celeste		1008	R	Wooden	March 2, 1910	3,550		3,224.73	
Riceland		1015	R	Concrete	Feb. 15, 1910	2,347		7,299.10	
Riceland		1015	R	Wooden	Feb. 15, 1910	390		307.17	
Totals						12,427		$ 19,804.39	

PONTCHARTRAIN LEVEE DISTRICT.

Hollywood	1—9	845	L	Dec. 31, 1907	Oct. 22, 1908	.....	16,700	115,695.80	$	20,755.83
Longwood	1—10	847	L	Oct. 15, 1908	Jan. 30 1909	2,377	7,593	127,283.51		21,561.83
St. Gabriel	2, 3, 6 & 7	861	L	July 22, 1907	Oct. 13, 1908	7,877	.....	44,811.00		8,514.09
Revenue	1—9	874	L	Sept. 11, 1908	June 30, 1909	3,013	.....	116,314.27		21,506.51
Dreyfous Lower	1,2,3,5,6,9	875	L	Dec. 31, 1907	Sept. 2, 1908	1,970	.....	73,313.93		13,216.75
Union	1, 2 & 8	894	L	Oct. 1, 1906	Oct. 9, 1908	.....	4,616	38,268.20		4,883.74
Bourbon, Lot 1	1--6	909	L	Oct. 1, 1908	Feb. 4, 1909	2,552	.....	83,638.78		17,480.51
Bourbon, Lot 2	1—6	909	L	Oct. 1, 1908	Feb. 4, 1909	2,615	.....	85,098.02		17,785.49
Prospect	4	935	L	July 22, 1907	Dec. 14, 1908	.....	1,992	14,580.10		2,697.32
Prospect (Restoring wave wash)	.....	935	L	Sept. 9, 1908	Nov. 25, 1908	.....	2,065	16,200.00		2,034.85
Totals	.....	.....		.....	.....	20,404 or 3.86 miles.	32,966 or 6.24 miles.	715,203.61	$	130,435.92

LAKE BORGNE LEVEE DISTRICT.

Chalmette	.....	970	L	Dec. 4, 1908	Jan. 20, 1909	575	.....	7,995.75	$	3,598.09
Woodlawn	4	992	L	Dec. 27, 1906	Oct. 20, 1908	123	3,470	14,078.66		3,097.31
Daisy	.....	1025	L	Nov. 23, 1908	Feb. 26, 1909	414	10,243	38,007.66		11,148.91
Point Pleasant	.....	1029	L	Built by U. S. Machine	May 7, 1909	.....	9,130	34,183.00		4,850.54
Lower Point Pleasant	.....	1032	L	..... do	March 30, 1910	.....	8,943	38,609.38		3,975.81
Totals	.....	.....		.....	.....	1,112 or 0.21 miles.	31,786 or 6.02 miles.	132,874.45	$	26,670.66

LEVEE REVETMENTS.

					Completed	Linear feet.		Cost.
Chalmette	.....	970	L	Concrete	Feb. 24, 1909	575	$	1,222.49
Daisy	.....	1025	L	Wooden	April 3, 1909	2,600		1,781.70
Point Pleasant	.....	1029	L	Wooden	Dec. 22, 1908	7,204		4,365.51
Totals	.....	.....		.....	.....	10,379	$	7,369.70

BANK REVETMENT WORK.

BONDURANT CHUTE: The slope between ordinary and extreme low water was paved for 951 linear feet at the lower end; repairs were made to 8,977 square feet of pavement, and the revetment extended down stream 110 feet. The total length of revetment in the Chute is now 3,550 feet.

KEMPE BEND: Repairs were made to revetment at the lower end, where a cave had destroyed about 300 feet of this revetment. The revetment was extended 300 feet up stream, and a detached piece 2,105 feet long was placed at the lower end of the bend on Stockridge Plantation. The total length of revetment in Kempe Bend is now 13,251 feet in two pieces, upper 11,146 feet long and lower 2,105 feet long.

GILES BEND (N. & V. HARBORS): During the past season extensive repairs were made to the revetment at the lower end, between Sections 19 and 26. During season 1908-9 the revetment was extended 1,520 feet, and now has a total length of 21,848 feet in two pieces, the upper 8,592 feet long and the lower 13,256 feet long.

NEW ORLEANS HARBOR: 3,955 linear feet of bank was revetted at the lower end of Carrollton Bend during the season 1909-1910; 5,937 linear feet in the Third District Reach during season 1908-1909. The total amount of bank revetment placed in New Orleans Harbor during the two seasons 1908-1910 was 9,892 linear feet.

UNITED STATES.

RECAPITULATION of work done from April 20, 1908, to April 20, 1910, as shown by the foregiong.

Name of District.	MILES. New Levee.	MILES. Enlargement.	Cubic Yards.	Cost.
Upper Tensas in Arkansas	3.36	16.46	796,710	$ 211,565.58
Upper Tensas in La. (Fifth Louisiana Levee Dist.)	1.25	....	312,035	65,527.35
Lower Tensas	3.55	12.59	1,876,489	502,640.14
Atchafalaya Basin	0.67	....	172,101	38,907.19
Pontchartrain	3.86	6.24	715,204	130,435.92
Lafourche	1.97	3.23	202,309	28,235.67
Lake Borgne Basin	0.13	0.66	22,074	6,695.40
Grande Prairie	0.08	5.36	110,800	19,975.26
Totals	14.87	44.54	4,207,722	$1,003,982.51

Average price per cubic yard, 23.86 cents.

APPENDIX A. STATEMENT NO. 23. SUMMARY ACCORDING TO DISTRICTS.

Approximate quantities and cost of levee work in the several Levee Districts of Louisiana, and in Desha and Chicot Counties, Arkansas, from April 20, 1908, to April 20, 1910, by the Districts, State and United States, as shown in the foregoing statements.

Name of District.	By Whom Done.	MILES. New Levee.	MILES. Enlargement.	Cubic Yards.	Cost.	Average Price Cubic Yard.
In Arkansas	Tensas Basin Levee District	1.51	4.55	716,594	$ 168,272.55	23.47
	United States	3.36	16.46	796,710	211,565.58	26.55
Totals		4.87	21.01	1,513,304	$ 379,838.13	....
In Louisiana	Tensas Basin Levee District	0.10	....	11,018	$ 2,100.00	23.00
Totals		0.10	....	11,018	$ 2,100.00	....
Fifth Louisiana Levee District	District	3.75	15.47	1,294,497	$ 313,173.16	24.31
	State	2.31	8.81	781,108	173,884.76	22.26
	United States	4.80	12.59	2,188,524	568,167.40	25.96
Totals		10.86	36.87	4,274,123	$1,055,225.41	....
Atchafalaya Basin Levee District	District	8.24	17.38	2,624,868	$ 574,739.73	21.89
	State	2.60	0.88	363,052	79,549.85	21.91
	United States	0.67	....	172,101	38,907.18	22.60
Totals		11.51	18.26	3,160,021	$ 693,196.77	....
Pontchartrain Levee District	District	3.13	0.14	591,188	$ 117,536.50	19.82
	State	1.33	0.98	274,164	61,728.45	22.55
	United States	3.86	6.24	715,204	130,435.92	18.23
Totals		8.32	7.36	1,580,556	$ 309,700.87	....

Name of District.	By Whom Done.	MILES. New Levee.	MILES. Enlargement.	Cubic Yards.	Cost.	Average Price Per Cubic Yard.
Lafourche Levee District	District	4.57	8.74	856,884	$ 267,323.32	30.11
	State	2.92	0.33	302,340	64,541.06	21.34
	United States	1.97	3.23	202,309	28,235.67	13.95
Totals		9.46	12.30	1,361,533	$ 360,100.05	....
Orleans Levee District	District	11.99	1.67	919,672	$ 630,030.09	53.85
Totals		11.99	1.67	919,672	$ 630,030.09	....
Lake Borgne Basin Levee District	District	0.19	....	19,331	$ 8,437.09	25.84
	State	1.75	0.75	175,940	34,882.07	21.90
	United States	0.13	0.66	22,074	6,695.40	30.33
Totals		2.07	1.41	217,345	$ 50,014.56	....
Grande Prairie Levee District	District	....	....	.....	$ 1,500.00	....
	State	2.16	3.35	140,494	41,820.73	23.57
	United States	0.08	5.36	110,800	19,975.26	18.03
Totals		2.24	8.71	251,294	$ 63,295.99	....
Buras Levee District	District	0.05	....	968	$ 193.60	20.00
	State	1.13	2.42	92,656	38,766.04	22.45
Totals		1.18	2.42	93,624	$ 38,959.64	....
Plaquemines Parish East Bank Levee District	District	7.25	....	283,243	$ 37,361.80	11.85
	State	0.69	....	13,031	2,143.60	16.45
Totals		7.94	....	296,274	$ 39,505.40	....

Caddo Levee District	District	9.60	0.54	531,086	$ 77,439.29	14.58
	State	5.46	....	419,661	62,868.44	14.10
Totals		15.06	0.54	950,747	$ 140,307.73	....
Bossier Levee District	District	6.85	....	363,814	$ 62,914.24	17.29
	State	4.70	0.87	330,965	49,368.82	14.91
Totals		11.55	0.87	694,779	$ 112,283.06	....
Red River Parish Sub Levee District	State	1.34	....	48,609	$ 8,059.12	16.60
Totals		1.34	....	48,609	$ 8,059.12	....
Red River, Atchafalaya and Bayou Boeuf Levee District	District	3.29	8.87	622,408	$ 110,515.19	17.75
	State	1.13	4.93	205,881	53,282.14	25.88
Totals		4.42	13.80	828,289	$ 163,797.33	....
Red River and Bayou des Glaizes Levee and Drainage District	District	3.08	....	338,271	$ 47,878.58	14.15
	State	0.66	4.98	102,280	12,463.33	12.18
Totals		3.74	4.98	440,551	$ 60,341.91	....
Saline Levee and Drainage District	District	0.65	....	44,032	$ 10,662.76	24.21
	State	1.60	....	99,930	16,343.14	16.35
Totals		2.25	....	143,962	$ 27,005.90	....

APPENDIX A. Statement No. 23—Continued. SUMMARY ACCORDING TO DISTRICTS.

RECAPITULATION.

Name of District.	MILES. New Levee.	MILES. Enlargement.	Cubic Yards.	Cost.
In Arkansas: Tensas Basin Levee District	4.87	21.01	1,513,304	$ 379,838.13
In Louisiana: Tensas Basin Levee District	0.10	.....	11,018	2,100.00
Fifth Louisiana Levee District	10.86	36.87	4,274,123	1,055,225.41
Atchafalaya Basin Levee District	11.51	18.26	3,160,021	693,196.77
Pontchartrain Levee District	8.32	7.36	1,580,556	309,700.87
Lafourche Levee District	9.46	12.30	1,361,533	360,100.05
Orleans Levee District	11.99	1.67	919,672	630,030.09
Lake Borgne Basin Levee District	2.07	1.41	217,345	50,014.56
Grande Prairie Levee District	2.24	8.71	251,294	63,295.99
Buras Levee District	1.18	2.42	93,624	38,959.64
Plaquemines Parish East Bank Levee District	7.94	.....	296,274	39,505.40
Caddo Levee District	15.06	0.54	950,747	140,307.73
Bossier Levee District	11.55	0.87	694,779	112,283.06
Red River, Atchafalaya and Bayou Boeuf Levee District	4.42	13.80	828,289	163,797.33
Red River and Bayou des Glaizes Levee and Drainage District	3.74	4.98	440,551	60,341.91
Saline Levee and Drainage District	2.25	.....	143,962	27,005.90
Red River Parish Sub-Levee District	1.34	.....	48,609	8,059.12
Totals	108.90	130.20	16,775,701	$4,133,761.96

RECAPITULATION.

	MILES.		Cubic Yards.	Cost.
	New Levee	Enlargement		
Arkansas River in Arkansas	3.28	....	102,663	$ 28,329.16
Mississippi River in Arkansas	1.59	21.01	1,410,641	351,508.97
Mississippi River in Louisiana	50.37	83.38	10,837,867	2,946,059.53
Red River	37.50	13.66	2,883,872	455,498.78
Atchafalaya River	6.07	12.15	1,126,712	258,792.86
Ouachita River	0.06	....	5,218	824.00
Boeuf River	0.04	....	5,800	1,276.00
Gulf Coast	7.25	....	283,243	37,361.80
Interior Levees	2.74	....	119,685	54,110.86
Totals	108.90	130.20	16,775,701	$4,133,761.96

Stream.	Levee District.	By Whom Done.	New Levee.	Enlargement.	Cubic Yards.	Cost.
Red River	Caddo	District	9.60	0.54	531,086	$ 77,439.29
		State	5.46	.....	419,661	62,868.44
	Bossier	District	6.85	.....	363,814	62,914.24
		State	4.70	0.87	330,965	49,368.82
	Red River Parish Sub	State	1.34	.....	48,609	8,059.12
	Red River, Atchafalaya and Bayou Boeuf	District	2.43	6.13	477,855	79,218.95
		State	1.13	1.14	127,369	28,282.11
	Red River and Bayou des Glaizes	District	3.08	.....	338,271	47,878.58
		State	0.66	4.98	102,280	12,463.33
	Saline	District	0.65	.....	44,032	10,662.76
		State	1.60	.....	99,930	16,343.14
Totals			37.50	13.66	2,883,872	$ 455,498.78
Atchafalaya River	Atchafalaya Basin	District	5.21	5.62	903,647	$ 202,496.59
	Red River, Atchafalaya and Bayou Boeuf	District	0.86	2.74	144,553	31,296.24
		State	.....	3.79	78,512	25,000.03
Totals			6.07	12.15	1,126,712	$ 258,792.86
Ouachita River	Tensas Basin	District	0.06	.....	5,218	$ 824.00
Totals			0.06	.....	5,218	$ 824 00
Boeuf River	Tensas Basin	District	0.04	.....	5,800	$ 1,276.00
Totals			0.04	.....	5,800	$ 1,276.00
Gulf Coast	Plaquemines Parish East Bank	District	7.25	.....	283,243	$ 37,361.80
Totals			7.25	.....	283,243	$ 37,361.80
Interior Levees	Orleans Levee	District	2.74	.....	116,685	$ 54,110.86
Totals			2.74	.....	116,685	$ 54,110.86

RECAPITULATION.

	MILES.		Cubic Yards.	Cost.
	New Levee	Enlargement		
Arkansas River in Arkansas	3.28	....	102,663	$ 28,329.16
Mississippi River in Arkansas	1.59	21.01	1,410,641	351,508.97
Mississippi River in Louisiana	50.37	83.38	10,837,867	2,946,059.53
Red River	37.50	13.66	2,883,872	455,498.78
Atchafalaya River	6.07	12.15	1,126,712	258,792.86
Ouachita River	0.06	....	5,218	824.00
Boeuf River	0.04	....	5,800	1,276.00
Gulf Coast	7.25	....	283,243	37,361.80
Interior Levees	2.74	....	119,685	54,110.86
Totals	108.90	130.20	16,775,701	$4,133,761.96

GRAND TOTAL.

	MILES				
	New Levee.	Enlargement.	Cubic Yards.	Cost.	Total Cost.
LEVEE WORK.					
District	64.25	57.36	9,217,868	$2,430,077.90	
State	29.78	28.30	3,350,111	699,701.55	
United States	14.87	44.51	4,207,722	1,003,982.51	
Totals	108.90	130.20	16,775,701	$4,133,761.96	$4,133,761.96
	MILES.		EXCAVATION.		
DRAINAGE.	Excavation.	Clearing.	Cubic yards.	Cost.	
District	14.84	10.94	337,487	$ 85,822.16	85,822.16
IMPROVING BAYOU LAFOURCHE.					
Districts	2.35	.....	430,264	$ 71,079.69	71,079.69
REVETMENT FOR BANK PROTECTION.	Miles.				
United States.. Third District, Improving Mississippi River	4.49	.....	.....	$ 367,396.45	367,396.45
Fourth District, Improving Mississippi River	2.61	.....	.....	.....	
Total	.....	.....	.....	.....	$4,658,060.26

APPENDIX B.

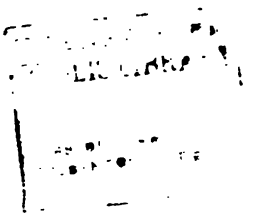
STATEMENTS RELATIVE TO HIGH WATER RECORDS.

Area

Stream	1907		1908		Highest since 1877	
Missouri	July 18	19.10	July 3		23.60	1881
	July 20	30.20	June 18		35.00	1903
Upper Mississippi	July 25,26	34.94	June 20		38.00	1903
Ohio	Mar 15	26.70	Mch 20		35.00	1907
	Jan 21	55.70	Mch 11,12		71.06	1884
	Jan 22	31.10	April 6		46.60	1884
Cumberland	Jan 24	29.50	Feb 16		55.30	1882
Tennessee	Jan 2	24.70	Feb 18		54.00	1875
Mississippi	Jan 27	45.55	Mch 19		52.20	1883
	Feb. 3	35.55	Mch 24,25		40.30	1907
	Feb 5,6	45.20	Mch 26		51.75	1897
	Feb 7,8	49.50	June 1,2		53.70	1903
Arkansas	Jan 24	32.70	May 27		35.00	1898
	Jan 25	27.80	May 30		31.20	1892
Mississippi	Feb 8	49.90	June 2,3		52.90	1903
	Feb. 9	44.75	June 3,5		49.10	1903
	Feb 10	44.10	June 5		46.48	1903
	Feb 10,11	47.80	June 5,8		52.48	1897
	Feb 13,14	48.70	June 14		50.35	1903
Red River	June 4	33.95	June 2		35.75	1876
	June 13	35.10	June 15		35.70	1892
	July 18,19	41.82	June 6		41.82	1908
Atchafalaya	Feb 19,20	48.00	June 14,23		50.95	1897
	Feb 20	39.70	June 22		39.70	1908
Mississippi	Feb 15,19	48.74	June 14,16		50.20	1897
	Feb 17,19	39.60	June 16,17		40.65	1897
	Feb 17,19	35.20	June 15,16		36.25	1897
	Feb 15,21	31.60	June 18		32.75	1897
	Feb 15,17,19	27.19	June 17		27.95	1897
	Feb 16	18.75	June 18		19.42	1903
	Feb 13,21	20.00	June 19,22		20.30	1903
	Feb 14,16,18	8.10	June 18		8.30	1907

Stages of the Mississippi River

New Orleans April 20, 1910



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REPORT

of the

Board of State Engineers

of the

State of Louisiana

to

His Excellency, Jared Y. Sanders,

Governor of Louisiana

from

April 20, 1910 to April 20, 1912.

The L. Graham Co., Ltd.
New Orleans, La.
1912

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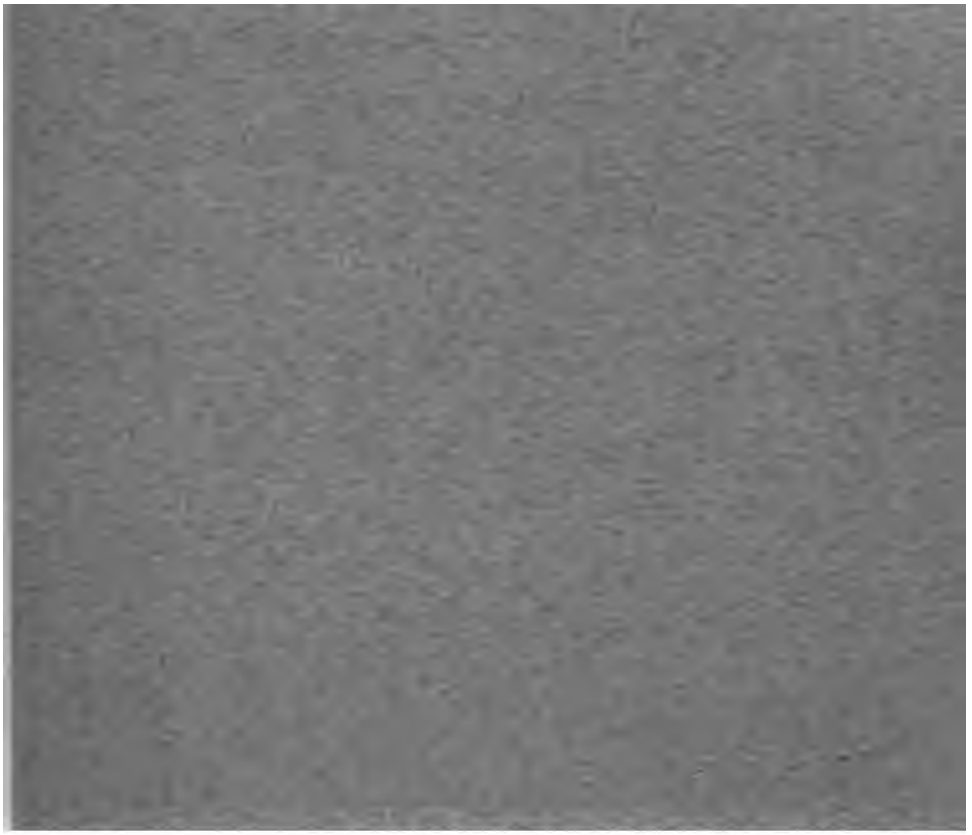

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Board of State Engineers.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 20, 1912.

To His Excellency, Jared Y. Sanders, Governor of Louisiana:

Sir—The Board of State Engineers has the honor to submit, for your Excellency's information, the following report, with accompanying appendices, covering the period from April 20, 1910, to April 20, 1912:

DUTIES AND PERSONNEL OF THE BOARD.

The Board of State Engineers was created by Act 33, approved February 10, 1879. The duties of the Board, as defined by this Act, are to make surveys of water courses, public works and levees of the State; to "report to the Governor of the State the improvements necessary and levees to be constructed, which are of prime importance to the State at large;" to furnish estimates and specifications of the work so required; to examine and measure the work recommended by the Board, and done under contracts made by the State, and to certify the amount of payments due for work thus executed.

Under the provisions of later laws, the Board has been constituted, in general terms, the engineers and advisers of the following named Boards of Levee Commissioners so far organized in the State, viz:

1. The Fifth Louisiana Levee District, by Act 44 of 1886.
2. The Tensas Basin Levee District, by Act 59 of 1886.
3. The Red River, Atchafalaya and Bayou Boeuf Levee District, by Act 79 of 1890.
4. The Pontchartrain Levee District, by Act 95 of 1890.
5. The Atchafalaya Basin Levee District, by Act 97 of 1890.
6. The Lafourche Basin Levee District, by Act 13 of 1893.
7. The Lake Borgne Basin Levee District, by Act 14 of 1892.

8. The Caddo Levee District, by Act 74 of 1892.
9. The Bossier Levee District, by Act 89 of 1892.
10. The Buras Levee District, by Act 18 of 1894.
11. The Cat Island Levee District, by Act 110 of 1894.
12. The Grand Prairie Levee District, by Act 24 of 1898.
13. The Plaquemines Parish East Bank Levee District, by Act 7 of 1902.
14. The Red River and Bayou des Glaizes Levee and Drainage District, by Act 107 of 1904.
15. The Saline Levee and Drainage District, by Act 80 of 1906.
16. The North Bossier Levee District, by Act 138 of 1906.
17. The Orleans Levee District. In the case of this District, created by Act 93 of 1890, the only reference to the Board of State Engineers is as follows:

"Section C. Be it enacted, etc., That the said Board of Levee Commissioners, as to location, construction and repairs of all levees necessary to protect said district, shall first have the approval in writing of the Board of State Engineers."

Later on, by Acts 79 of 1892, and 140 of 1900, the Board of Commissioners of the Orleans Levee District was required to have the approval in writing of the Board of State Engineers, as to location, construction and repairs of levees "on the river front of said District," only.

In addition to the foregoing, a number of general laws are in force, specially calling for, or imposing other duties upon, either the Board of State Engineers, as a whole, or the Chief State Engineer, as the head of the department.

In fact, with each recurring session of the General Assembly of the State, the field operations of the Board of State Engineers are materially enlarged, and the duties required of its members and its corps of employees greatly increased.

In addition to the general administration of the affairs of the department, as specified by law and passed into practice by precedent, the Board of State Engineers has, during this period, been called into service on a number of occasions in the matters of information, advice and direction by your Excellency, notably, in furtherance of the good roads movement; by the United States, many of the Police Juries of the State, drainage and reclamation districts, and other public

bodies, involving, in a number of instances, extended inspections, surveys and other engineering work.

In this way, the constant care and attention of the members of the Board of State Engineers has been necessary during the entire time covered by this report, and, in addition to the office force proper, has required the regular employment of a number of instrument men, and, from time to time, of an equal number of rodmen, as assistants in the field. On occasions, too, the employment of men in other capacities, both in the field and in the office, was demanded.

With direct reference to the members of the Board of State Engineers, themselves, their attention has, as heretofore, been directed to the affairs of all the levee districts, and to duties in any one of them, as occasion demanded. As a matter of system and convenience, however, the performance of the engineering work required in the levee districts generally, was, up to March 30th, 1911, assigned for special attention as follows, viz: In the Tensas Basin and Fifth Louisiana Levee Districts, to Assistant State Engineer Walter H. Hoffman; in the Atchafalaya Basin, Lafourche and Buras Levee Districts, to Assistant State Engineer H. C. Smith; in the Pontchartrain, Lake Borgne, Grand Prairie and Plaquemines Parish East Bank Levee Districts, to Assistant State Enigneer J. W. Monget; in the Caddo, North Bossier, Bossier, Red River, Atchafalaya and Bayou Boeuf, Red River and Bayou des Glaizes, and Saline Levee Districts, to Assistant State Engineer Gervais Lombard.

On March 30th, 1911, however, in order to comply with the requirements of Act No. 49 of 1910, known as the "Highway Law," Assistant State Engineer Gervais Lombard was, for economic and other reasons, selected, by resolution of the Board of State Engineers, to act as State Highway Engineer, pending the employment later on by the Board of State Engineers of a competent person to fill that position.

This required a re-distribution of territory to the other three members of the Board, resulting as follows, viz: The Tensas Basin, Fifth Louisiana, Caddo, North Bossier and Bossier Levee Districts to Assistant State Engineer Walter H. Hoffman; the Red River, Atchafalaya and Bayou Boeuf, Red River and Bayou des Glaizes, Saline and Atchafalaya Basin Levee

Districts to Assistant State Engineer H. C. Smith; the Pontchartrain, Lafourche Basin, Buras. Lake Borgne, Grand Prairie and Plaquemines Parish East Bank Levee Districts to Assistant State Engineer J. W. Monget.

The special engineering work required, during the period of this report, by the Orleans Levee District, the Joint Organization of the Atchafalaya Basin and Lafourche Levee Districts, the Board of Control of the New Basin Canal and Shell Road, and the Board of Control of the Louisiana State Penitentiary, together with attention to the general administration of affairs connected with public improvement in all parts of the State, and in the main office of the Department, devolved upon Chief State Engineer Frank M. Kerr.

Levee Work for the Past Two Years.

The contracts and agreements for levee work, undertaken during the past two years, by the State of Louisiana and the several levee districts of the State, with twenty-four contracts entered into previous to April 20th, 1910, and still in force at that date, numbered one hundred and forty-eight, involving the handling of 8,992,001 cubic yards of earthwork, estimated to cost $1,795,703.93.

The amount and cost of levee work actually performed under these contracts (not taking into consideration percentages retained until completion), between April 20th, 1910 and April 20th, 1912, by the State of Louisiana, and the Levee Districts of the State, with that done by the United States, is shown in the following table:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The Levee Districts	28.73	46.06	5,199,876	$1,183,167.33
The State of Louisiana	26.38	45.01	2,892,125	612,536.60
The United States	11.47	36 29	3,205,090	636,514.15
Aggregates	66.58	127.36	11,297,091	$2,432,218.08

The foregoing, divided as to territory, is as follows:

LOCALITY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
IN ARKANSAS				
On the Arkansas River	0.70		273,572	$ 92,905.54
On the Mississippi River	1.44	10.70	874,989	206,143.61
IN LOUISIANA				
On the Mississippi River	30.69	76.57	7,577,560	1,565,214.09
On the Red River	14.87	2.62	973,318	172,418.83
On the Atchafalaya River	5.71	7.80	996,274	286,155.81
On the Boeuf River	0.14		12,545	2,877.80
On the Gulf Coast	5.35	23.67	392,139	65,324.56
Interior Streams	7.68	6.00	196,685	41,177.84
Aggregates	66.58	127.36	11,297,091	$2,432,218.08

The amounts given in the foregoing tables do not include those involved in the drainage work executed by the Red River, Atchafalaya and Bayou Boeuf Levee District, during the past two years, costing $10,159.84. Nor do they include the work for the improvement of Bayou Lafourche, for navigation and the supply of fresh water, undertaken by the Joint Organization of the Atchafalaya Basin Levee District and the Lafourche Levee District, on which some $486,892.16 has been expended from inception to date.

In addition to the above, there still remains to be done, under contracts of the State and the several Levee Districts of the State, in force at this time, an amount of levee work estimated to aggregate not less than 2,030,054 cubic yards, and to cost (in addition to percentages retained until completion) not less than $365,513.84.

Again, a considerable amount of work has, as usual, also been done in, and expenditures incurred by the several levee

districts of the State and by the United States for weed cutting, minor repairs, wooden revetments and for auxiliary works of various descriptions, information upon which to base exact statements in regard to all these particulars is not, in every instance, at hand, but the sum involved was, as usual, considerable.

Details relative to the location, character, extent and cost of the levee work of the past two years will be found in the paragraphs of this Report appearing under the head of "The Levee Districts," and in tabular form in Appendix A.

The Levee System.

The principal lines of continuous levee at present protecting the alluvial lands of Louisiana against overflow are as follows:

(1) From the high lands near Pine Bluff, Ark., down the right bank of the Arkansas River, to within about five miles of the mouth of the old Arkansas River, a distance of about eighty-seven miles, extending through the Linwood-Auburn District of Jefferson County, the Linwood-Auburn Levee District of Lincoln County, the Red Fork Levee District, and that part of the Desha Levee District above Arkansas City, some seventy-one and four-tenths (71.4) miles of which is leveed continuously. At the lower end of this continuous line, an extension, some 2.6 miles in length, running along Dry Bayou towards the main line of levee constituting the head of the Mississippi River Levees has been constructed by the United States. This extension reduces the gap between the Mississippi and Arkansas River levee systems to about 3.5 miles.

(2) From Costello's Gin, a point on Amos Bayou, about five miles South of Red Fork and about twelve miles West of the mouth of the Arkansas, a continuous line of levee extends down the left bank of Amos Bayou about five miles; thence—crossing Boggy Bayou to the right bank of Cypress Bayou, about 1.5 miles; thence about six miles down the right bank of Cypress Bayou to Lucca Landing, on the Mississippi River, where it joins the levee system on the right bank of the Mississippi River; and thence continues down through Desha and Chicot Counties, Arkansas, to Panther Forest, 16 miles below Arkansas City, where a breach in the line of levee oc-

curred on April 12, 1912. Thence the line, at this date, is still continuous down through Chicot County, Arkansas and the Fifth Louisiana Levee District to Alsatia Plantation, about 17 miles below Lake Providence, in East Carroll Parish, Louisiana, where a breach occurred on the same day. Thus, with the exceptions stated, the line of levee from Costello's Gin, Arkansas, to Point Breeze, Louisiana, aggregates about 325.4 miles in length.

(3) From Torras Landing, at the mouth of Red River, (or, more properly, the mouth of Old River), the levee extends down the right bank of the Mississippi River, without break or interruption, to the outlet known as "The Jump"—that is, to within about 10 miles of the head of the Passes, a length of 285.7 miles.

And from the same point at Torras Landing, the levee line runs along the South bank of Old River 5.7 miles to Barbres Landing; and thence down the left bank of the Atchafalaya River, to a point about 9.7 miles below East Melville, where a breach in the line occurred on April 6, 1912. From this point to a point 2.1 miles below Bayou Alabama, the line is at this time, again still continuous, making an aggregate from Torras Landing to the present terminus below Bayou Alabama of 49.6 miles.

(4) On the left bank of the Mississippi River the levee line extends uninterruptedly from Baton Rouge to what is known as the Lucas Canal, about 6.0 miles below Fort St. Philip, a length of about 217.2 miles.

Up to 1909, the outlet through the left or East bank of the river, known as Baptiste Collette Gap, located about three miles below Fort St. Philip, remained open.

However, upon the strong representation of parties in interest, that the overflow through this gap or outlet was, even at normal stages of the river, causing serious and extended damage to considerable areas of land, and to certain important and valuable interests, particularly the oyster interests, this gap was finally closed in 1909, provision therefor having been made jointly by the State, the Grand Prarie Levee District, and what was at that time known as the Oyster Commission of Louisiana, since styled the Fish and Game Commission.

The line of levee thus built, including the dam proper across

the outlet, and the wings along the upper and lower side of the outlet, is 6,451 feet in length, or 1.2 miles, thus forming a detached local stretch of levee (in the Grand Prarie Levee District) of that length, in addition to the continuous line in the district of 30.4 miles.

(5) The upper levee system of the Caddo Levee District, on the right or West bank of Red River, extends from Blanton Bluff, Arkansas, about three-quarters of a mile above the Louisiana Line, to Twelve Mile Bayou, a length of line of about 51.4 miles.

(6) The lower levee system of the Caddo Levee District--also on the right or West bank of Red River—, extends from the Bluffs, on the North side of Bayou Pierre, to near the lower limits of Caddo Parish, a length of line of about 34.9 miles.

(7) The levees of the Bossier Levee District, on the left bank of Red River, extend from the highlands opposite Old Benton, Louisiana, to the old Dennison Plantation, a length of about 48 miles.

Below this, the natural banks of Red River, in Bossier Parish, are, except at Ninock and Swift Chute Bayous, generally high enough, as compared with the high water of the past, to restrain all but very extreme floods, occurring, in the light of history, at long intervals of time. Both of these streams are closed by levees.

(8) Along the South bank of Loggy Bayou, in the Parish of Red River, there has been constructed by the State, during the past year, an aggregate of 0.9 miles of levee, in the form of ten dikes, closing as many sloughs and depressions, formerly permitting escape from Loggy Bayou, in time of flood in Red River, and overflowing considerable territory below, much in advance of the bank full stages of Red River and Loggy Bayou, which are generally superior in elevation to most high waters in Red River.

(9) The upper system of the Red River, Atchafalaya and Bayou Boeuf Levee District, is continuous from a point on the South bank of Bayou Rapides, on the Cooper Place, about 7.6 miles above Alexandria, to its junction with Red River, at the latter point; thence down the right bank of Red River to the Avoyelles Prairies at David's or Moncla's Ferry, 35.3 miles in length, or a total for the upper system of 42.9 miles.

(10) The lower levee system of the Red River, Atchafalaya and Bayou Boeuf Levee District is continuous on the right bank of Bayou des Glaizes, from the "Junction," a point about 9.0 miles above Moreauville, down the Bayou to its junction with the Atchafalaya River, at Simmsport, about 48 miles; and thence down the right or West bank of the Atchafalaya River to a point near Atkins Bayou, about 4.5 miles below Melville, where a breach in the line of levee occurred on April 10, 1912. From this point to and across Bayou Bigraw, the line is, at this time, again still continuous for about 10 miles. The total mileage for the entire district is, at this time, therefore, about 130.7 miles.

(11) The levee system of the Red River and Bayou des Glaizes Levee and Drainage District, will, when completed, comprehend a length aggregating probably 125 miles, of which, however, only 27 miles have so far been constructed, extending from the Avoyelles Prairies at David's or Moncla's Ferry to a point about 1.5 miles below Natchitoches Bayou.

(12) The levee system contemplated for the Saline Levee and Drainage District aggregates about 17.5 miles in length. Of this, however, but 10.3 miles, extending from Cassandria to and across Coco Point, have so far been completed.

(13) The levee system of the Plaquemines Parish East Bank Levee District excludes the overflow waters of the Gulf of Mexico from that portion of the Parish of Plaquemines included in the Lake Borgne Basin and Grand Prairie Levee Districts, extending from the upper line of Harlem Plantation to the upper bank of Cusilich Canal, on the property of Peter Cusilich, below the site of the old quarantine station, a distance by the levee line of about 32.3 miles. In addition to this, there are cross levees at Harlem, Bohemia, Nestor Canal (both sides), Bayou Lamoque (both sides), and Cusilich Canal, agregating about four (4) miles.

The aggregate length of levee lines thus generally described is 1,302.6 miles. In addition to these, there are a number of lengths of levee lines in comparatively isolated localities, and on interior streams, some parts of which are not located in any regular levee district, aomunting to about 333.8 miles, making a total length of levee lines more or less protecting

Louisiana, at this time, of 1,636.4 miles; that is, 158.3 miles in the State of Arkansas and 1,478.1 miles in Louisiana, divided, according to territory and streams, as follows, viz:

REVISED LENGTHS OF LEVEE LINES IN LOUISIANA AND THAT PART OF ARKANSAS AIDING IN THE PROTECTION OF LOUISIANA. APRIL 20, 1912.

	Miles on Mississippi River	Miles on Red River	Miles on Atchafalaya River	Miles on Bayou Lafourche	Miles on Other Streams	Total Miles By Districts
Tensas Basin					(a) 40.0	40.0
Fifth Louisiana	241.1				(b) 39.0	280.1
Atchafalaya Basin	127.2		43.9	(c) 75.0		246.1
Pontchartrain	125.5				(e) 0.3	125.8
Lafourche	117.0			(e) 74.1		191.1
Orleans	25.7				(f) 46.8	72.5
Lake Borgne Basin	48.0					48.0
Grand Prairie	31.6					31.6
Plaquemine Parish East Bank					(g) 36.3	36.3
Buras	33.6					33.6
Caddo		86.3			(h) 9.0	95.3
Bossier		48.0				48.0
Red River, Atchafalaya and Bayou Boeuf		35.3	39.8		(i) 55.6	130.7
Red River and Bayou des Glaizes		27.0				27.0
Saline		10.3				10.3
North Bossier (j)						
Cat Island	(k) 12.8					12.8
State of Arkansas, aiding in the protection of Louisiana	71.8				(l) 86.5	158.3
Outside of Levee Districts	(m) 13.1	(n) 35.9				49.0
Total by Streams	847.4	242.8	83.7	149.1	313.5	1,636.5

a Includes 10.5 miles on Ouachita River, 17 miles on Black River, and 13 miles on Little River.

b. Includes 12.7 miles on Black River, and 26.3 miles on Tensas River.

c. and e. These systems, due to closure of bayou at head, pending construction of lock, in disuse at this time, also since closure of Bayou Lafourche, cut through in many places for easy access to bayou for connecting canals.

d. Includes 0.3 miles of cross levee at head of system.

f. Rear levees, etc.

g. Along Gulf Coast, Parish of Plaquemines, East Bank, includes 7 cross levees.

h. All on Bayou Pierre in disuse since closure of Tones Bayou.
i. Includes 7.6 miles on Bayou Rapides and 48 miles on Bayou des Glaizes.
j. System not yet begun.
k. Fragmentary, built before organization of district. Distrirt not in operation.
l. Includes 71.4 miles on Arkansas River, from Pine Bluff, Ark., to lower end of Arkansas River system, also 2.6 miles extension of Arkansas levee system towards Cypress Bayou, and 12.5 miles on Amos Bayou and Cypress Bayou above head of system on Mississippi River.
m. Around Angola State Farm.
n. Includes Loggy Bayou new levee 0.9 miles, Murrel new levee 0.4 miles, Westdale 0.9 miles, Grand Bend 0.6 miles, and 33.1 miles of fragmentary lengths of levee lines on Red River.

The Construction of Levees.

In the construction of levees in Louisiana, and that part of Arkansas affecting Louisiana, undertaken by the State and the levee districts of the State, the following general specifications, quoted from the "General Specifications and Conditions," usually maintain, viz:

"3rd. The contractor assumes all risks from subsidence in foundation, or base, accidents, floods and casualties of every kind which may occur before the completion and acceptance of the work, and shall sustain all damages and injury that may be caused thereby.

"4th. No part of the work herein contracted for shall be given, sold, or assigned to a sub-contractor without the consent of the President of this Board, expressed in writing; nor shall said contractor or his sureties be released from personal and immediate responsibility without like consent.

"5th. The embankment shall be built of such material, and disposed and distributed in such manner as the engineer in charge may direct, under the requirements of the Board of State Engineers. The required allowance for shrinkage shall be added to the height of the embankment; this allowance to be at the discreation of the engineer in charge, up to one-fifth in excess of the net height of the embankment; it being understood that a cubic yard of embankment under this agreement is a net cubic yard of settled earth, and equal to five-sixths of a cubic yard of material in place, within the limits prescribed.

"6th. **The contractor shall remove all trees, stumps, logs, roots, stalks, weeds, grass, trash and perishable matter of every kind not specially exempted from this requirement by instructions from the engineer in charge, and plow or spade up the ground over the entire surface to be covered by the embankment. He shall grub up by the roots all trees and stumps within the limits of the base of the embankment, and three feet on either side of the base. He shall remove all buried logs, brick or walls and other material considered unsuitable by the engineer in charge. He shall refill all holes made by grubbing or by the removal of unsuitable materials, as aforesaid, with solid earth up to the level of the natural surface of the ground, and the refilling of such holes shall not be paid for by the cubic yard (except in special cases, when so directed by the engineer in charge), but shall be considered as a part of the clearing and grubbing to be done as incidental or auxiliary work, payment for which shall be included in the price per cubic yard of embankment hereinafter stipulated. He shall carefully clean all ditches crossing the** line of embankment, and fill them with solid earth up to the level of the natural surface of the ground for a distance of twenty (20) feet from the base of the embankment on the land side, and for the width of the berme prescribed on the river side. He shall cut muck ditches of such depth and size as may be prescribed by the engineer in charge. If required by the engineer in charge, the clearing, grubbing, preparation of base and cutting of muck ditch, as above, shall be completed, and the muck ditch refilled throughout the whole length of the embankment, or any part thereof, before the embankment be begun. In the construction of the embankment he shall, except where other material may be ordered by the engineer in charge, use earth only, and shall place it in layers of such thickness as may be directed by the engineer in charge, and extending the full width of the embankment. Except when otherwise granted permission in writing by the engineer in charge, he shall obtain all earth from the river side of the embankment, leaving a berme of the natural surface of the ground.....feet wide between the base of the embankment and the borrow pits. Unless otherwise directed by the ngineer in charge, all borrow

pits shall be sloped on the side nearest the embankment not steeper than three (3) horizontal to one (1) vertical, and on that side shall not be deeper than three (3) feet, from which point the bottom of the pit may slope away from the berme on a slope not steeper than seven (7) feet vertical in one hundred (100) feet horizontal for one hundred (100) feet, at which point and beyond, the depth of the pit, for such width as may be required to supply material for the embankment, shall not exceed ten (10) feet below the natural surface of the ground. At intervals not greater than three hundred (300) feet, "traverses" of the natural surface of the ground, not less than twenty (20) feet wide, shall be left undisturbed, extending entirely across the pits, except that a ditch of such dimensions as may be directed by the engineer in charge shall be cut through the "traverses," on the side of the pit next to the river, to allow drainage from one pit to another. He shall plant the entire surface of the completed embankment with living roots or sods or Bermuda grass, not more than one (1) foot apart, and to the satisfaction of the engineer in charge. He shall cut down all trees, bushes and saplings for a width of one hundred (100) feet on each side of the embankment where it runs through woods or timber, and, in open land, he shall cut down such trees, etc., within one hundred (100) feet of the embankment as the engineer in charge may direct. Unless otherwise directed, he shall cut all trees and stumps within twenty-five feet of the base of the embankment on the land side, down to the level of the ground (but shall not disturb or destroy the engineer's bench marks or other reference points), and shall leave the ground clear of all fallen timber, brush or other debris or material obstructing free passage along the base of the embankment on the land side for a width of twenty-five feet. He shall take care to preserve the engineer's stake and bench marks, and shall at all times keep the station stakes at or opposite their proper location. If required by the engineer in charge, he shall dig a drainage ditch on the land side of the embankment, of such dimensions and at such distance from the base as may be prescribed, but shall not otherwise break up the surface of the ground on the land side of the embankment, except by written permission

of the Engineer in charge. He shall cut such openings through the old embankment or embankments as may be required by the Engineer in charge. When required by the Engineer in charge, the earth taken from openings made through the old embankment and from drainage ditches, shall be deposited in the embankment under construction, in which case it shall be paid for as embankments only, but otherwise it shall be measured and paid for in excavation. Except by special permission of the Engineer in charge, all existing embankments, or parts of old embankments, must be left undisturbed."

In addition to the foregoing, whenever practicable, the following specifications have, during the past two years, been prescribed:

"A sipe ditch or canal, for drainage, shall be required on the land side of the line of levee.....feet from the edge of the base of the levee, excavated to such dimensions and in such manner as may be prescribed by the Engineer in charge. The material (earth) excavated from said ditch or canal may be utilized in the construction of the levee, and when so utilized shall be paid for in embankment, but not otherwise. The ditch or canal shall be left free of all stumps, trees, logs, etc."

"All borrow pit areas shall be cleaned and grubbed to facilitate the observance of specifications governing the dimensions and shape of same."

The grade line usually observed by the levee authorities of the State is that adopted and prescribed by the Mississippi River Commission.

In the matter of cross sections, slopes of 2 and 3 to 1, 3 and 2 to 1, $2\frac{1}{2}$ and $2\frac{1}{2}$ to 1, 3 and 3 to 1, 3 and 4 to 1, and 3 and 10 to 1, with width of crown varying from 4 to 50 feet, dependent upon location, height of levee, stability of bank, whether the bank requires protection by revetment or not, the availability of means, etc., are in practice.

By law, banquettes are required to be built over all bayous or sloughs crossed by levees. Banquettes have also been generally prescribed across depressions of the ground in marked contrast with the general elevation of the natural surface in the vicinity of the levee; also where the general height of a levee exceeds 15 feet. Such banquettes are, as a rule, located along the land side of the line of levee, forming part of its

land side base. A disposition, however, continues to gain favor to as much as possible avoid the construction of banquettes, and, in lieu thereof, adopt flatter slopes.

Where lines of levee are generally exposed to wave-wash, due to wind, the passage of steamers, etc., wooden revetments are, where practicable and the means are available, built and maintained by the State and levee districts.

The United States also, when called upon to protect from wave-wash lines of levees built under its direction, on the "Lower Coast" (the Mississippi River below New Orleans), has, after considering various forms of protection, selected the paving of the entire river side slope of the levee with a layer of concrete.

Thus far, such paving as has been done presents a fine appearance, and is performing its offices satisfactorily.

The earth utilized in building the levees of the State, by the levee districts of the State, still continues to be moved mostly by scrapers drawn by mules. Wagons and graders are, in most instances, used in conjunction with scrapers. Men with wheel barrows, and power driven machinery, in the order named, come next in volume of work accomplished, the latter gaining material ground over former accomplishments.

During the past two years, the work performed by the districts and the State, by the various methods employed, was (exclusive of the Orleans Levee District) as follows: By scrapers drawn by mules, 59.8 per cent; by men with wheel barrows, 21.5 per cent; and by power driven machinery, 18.7 per cent.

The average cost of the levee work performed by the levee districts and the State, by all methods, during the past two years, was (exclusive of the Orleans Levee District) 20.10 cents per cubic yard; and by the three methods named: as follows: By scrapers drawn by mules, 17.30 cents per cubic yard; by men with wheel barrows, 21.5 cents per cubic yard, and by power driven machinery, 22.10 cents per cubic yard.

Supervision, Care and Maintenance of Levees.

The present status of operations, for the supervision, care and maintenance of levees in the State, by the levee districts and the State, is still not materially different from that

on the dollar. The Orleans Levee District is restricted to an ad valorem tax of one mill on the dollar. Most of the districts also have power to levy assessments or forced contributions upon agricultural products raised within their territory, and upon railroads of standard gauge, while some of them, the boundaries of which touch upon the Gulf Coast, and bays, may impose a local assessment or forced contribution upon oysters. The aggregate of district levee bonds now authorized in all the districts is $8,570,000.00, of which $7,462,500.00 is, at this time, outsanding. The total assessed valuation of the same levee districts, (exclusive of the Cat Island Levee District, in which no local assessments have so far been made), as shown on the tax rolls of 1911, is $318,971,005.00.

A general description of the levee districts in the State, so far authorized by law, with statistical and other information of interest relating to them, follows. It should be explained that the cost of the levee work done during the past two years, and remaining, at this date to be done under existing contracts, shown in the following statements, is, in the first case, inclusive of, and, in the second case, exclusive of, percentages retained until completion.

1. *The Tensas Basin Levee District:* Composed of the Parishes of Morehouse, West Carroll, Richland, Franklin, Catahoula and LaSalle, with those portions of Ouachita and Caldwell Parishes lying East of the Ouachita River. As the overflows to which the district is most liable result from flood waters escaping from the Arkansas and Mississippi River, in Arkansas, authority in law is given to it to apply its resources to the construction, improvement and maintenance of such lines of levee in the State of Arkansas, South of the Arkansas River, as, in the judgment of the Board of Commissioners, concurred in by the Board of State Engineers, are recognized to possess a material bearing upon the protection of the district.

The United States "Upper Tensas District" includes the same levee line, and the larger part of the levee work done on it continues to be contributed by the United States.

The lengths of the lines of levee upon which this district directly depends for protection from overflow, and towards the construction and maintenance of which it directs its financial aid are as follows: On Amos Bayou Ridge and Cypress

Creek, 12.5 miles; the Mississippi River, from the mouth of Cypress Creek to the State Line, 71.8 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of eight members, one being appointed from each Parish, or part of Parish, in the district.

The domicile of the Board is at Rayville, Richland Parish, La.

The district taxes and forced contributions permitted by law to be levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions, etc., thereon.

Forced Contributions: Five cents per acre on all lands within the district; $60.00 per mile of standard gauge railroad, and $30.00 per mile on railroads of less than standard gauge.

In adition to the foregoing resources of the district, 10 per cent of the General Engineer Fund (17/20 of a mill general State tax) is required by law to be set aside and expended annually in the interest of the district.

The authorized bonded debt of the district is $150,000.00, of which $65,000.00 is, at this time, outstanding.

The assessed valuation on the tax rolls for 1910 and 1911 was $7,338,416.00 and $7,174,448.00, respectively.

The amount and cost of the levee work done in the district, and in that part of Arkansas affecting the district, during the past two years, by the district, and the United States, is approximately as follows:

WORK DONE BY	Miles of		Cubic Yards	COST
	New Levee	Enlargement		
The District	1.58	5.78	771,099	$183,963.85
United States	0.70	4.92	390,007	117,963.10
Totals	2.28	10.70	1,161,106	$301,926.95

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done is approximately as follows: 49,074 cubic yards, to cost about $10,796.28, located as follows: at Lower Lucca, Desha County, Arkansas.

In addition to the foregoing, the district, during the same period expended, in minor repairs, and for the care, preservation and protection of its line generally, about $864.17. However, owing to the exigencies arising from the high water of 1912 to date, the resources of the district for high water expenses are being severely taxed to an extent that cannot at this time be estimated.

The United States, in bank protection work, along reaches of the Arkansas and Mississippi Rivers, in Arkansas, affecting levees in which the Tensas Basin Levee District is interested, also entered upon projects involving large outlays of money.

The condition of the line of levee in Arkansas affecting Louisiana, from the point of view of grade, is, at this time, as shown in the following table:

COUNTY	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	Total Miles In County
	Miles	Miles	Miles	
Desha	12.5	2.9	17.4	32.8
Chicot	14.8	26.2	13.9	55.9
Totals	27.3	29.1	31.3	87.7
Percentages	26%	28%	46%	

2. *The Fifth Louisiana Levee District:* Composed of the Parishes of East Carroll, Madison, Tensas and Concordia.

That part of the levee in the district, extending from the Arkansas Line to a point opposite Warrenton, Miss., is included in the United States "Upper Tensas District," and that below said point, extending to the mouth of Red River, coincides with the United States "Lower Tensas District."

The total length of the levee line in the district at this date is about 241.1 miles, the present lower terminus of the system being within eight miles of the mouth of Red River.

The affairs of the district are conducted by a Board of

Commissioners composed of eight members, two from each Parish.

The domicile of the district is at Delta, Madison Parish, La.—postoffice address of the President of the Board of Commissioners, Tallulah, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $100.00 per mile on railroads of standard gauge, $20.00 per mile on railroads of less than standard gauge, and $1.00 per bale on all cotton grown within the district.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.00.

The assessed valuation of the district on the tax rolls of 1910 and 1911 was $8,795,310.00 and $8,619,245.00, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district, the State and the United States, is approximaely as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	2.89	16.89	1,393,362	$239,774.73
The State	3 52	10.17	877,248	219,839.07
The United States	5.29	22.25	1,761,648	328,954.76
Totals	11.70	49.31	4,032,258	$788,568.56

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done is approximately as follows: 49,074 cubic yards, to cost about $10,796.28, located as follows: at Lower Lucca, Desha County, Arkansas.

In addition to the foregoing, the district, during the same period expended, in minor repairs, and for the care, preservation and protection of its line generally, about $864.17. However, owing to the exigencies arising from the high water of 1912 to date, the resources of the district for high water expenses are being severely taxed to an extent that cannot at this time be estimated.

The United States, in bank protection work, along reaches of the Arkansas and Mississippi Rivers, in Arkansas, affecting levees in which the Tensas Basin Levee District is interested, also entered upon projects involving large outlays of money.

The condition of the line of levee in Arkansas affecting Louisiana, from the point of view of grade, is, at this time, as shown in the following table:

COUNTY	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	Total Miles In County
	Miles	Miles	Miles	
Desha	12.5	2.9	17.4	32.8
Chicot	14.8	26.2	13.9	55.9
Totals	27.3	29.1	31.3	87.7
Percentages	26%	28%	46%	

2. *The Fifth Louisiana Levee District:* Composed of the Parishes of East Carroll, Madison, Tensas and Concordia.

That part of the levee in the district, extending from the Arkansas Line to a point opposite Warrenton, Miss., is included in the United States "Upper Tensas District," and that below said point, extending to the mouth of Red River, coincides with the United States "Lower Tensas District."

The total length of the levee line in the district at this date is about 241.1 miles, the present lower terminus of the system being within eight miles of the mouth of Red River.

The affairs of the district are conducted by a Board of

Commissioners composed of eight members, two from each Parish.

The domicile of the district is at Delta, Madison Parish, La.—postoffice address of the President of the Board of Commissioners, Tallulah, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $100.00 per mile on railroads of standard gauge, $20.00 per mile on railroads of less than standard gauge, and $1.00 per bale on all cotton grown within the district.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.00.

The assessed valuation of the district on the tax rolls of 1910 and 1911 was $8,795,310.00 and $8,619,245.00, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district, the State and the United States, is approximaely as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	2.89	16.89	1,393,362	$239,774.73
The State	3.52	10.17	877,248	219,839.07
The United States	5.29	22.25	1,761,648	328,954.76
Totals	11.70	49.31	4,032,258	$788,568.56

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district is approximately as follows:

By the District	1,733,465 Cubic Yards	Costing $329,843.59
By the State	478,464 Cubic Yards	Costing 88,843.74
Totals	2,211,929 Cubic Yards	Costing $418,687.33

This work is located as follows: At Wyly to Hollybrook, Villa Vista, Section 1, Biggs, Reid, Delta to Martin, Martin, Ingefield, Kempe, Hodges, Diamond Island and Claremont.

In addition to the foregoing, the district, during the same period, expended in minor repairs and for the care, protection and preservation of its line of levee generally, including drainage of battures, etc., $14,780.90. No expenditures for protection work during high water were made by this district during the past two years, until the high water of 1912, the demands for which have been and are still very great, but cannot at this time be stated in figures.

The United States assumed the construction of and accomplished much in the way of bank protection work in the district, also, during the past two years, involving further large expenditures.

The condition of the levee line in this district, with regard to grade, is at this time about as shown in the following statement, viz:

Parish	1 to 2 Feet above High Water	2 to 3 Feet above High Water.	3 to 4 Feet above High Water	4 to 5 Feet above High Water	5 to 6 Feet above High Water	6 Feet and Over above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	Miles	Miles	
East Carroll			21.7	34.7			56.4
Madison		2 3	8.9	24.7	7.4		43.3
Tensas			6.3	6.4	45.2	0.2	58.4
Concordia		12.2	14.0	8.1	28.7	20.0	83.0
Totals		14.5	50.9	73.9	81.6	20.2	241.1
Percentages		7%	21%	30%	33%	9%	

(Provisional grade recommended by the Mississippi River Commission: 4.0 feet above high water in East Carroll and Madison Parishes; 5.0 feet above at Bedford; 5.5 feet above at L'Argent; 6.1 feet above at Vidalia, and 5.1 feet above at Bougere, with light topping of 1½ feet in addition, from the Arkansas State line to opposite Warrenton, Miss.)

(3) *The Atchafalaya Basin Levee District:* Composed of the Parishes of Pointe Coupee, West Baton Rouge and Terrebonne, and parts of the Parishes of Iberville, Ascension, Assumption, Lafourche, St. Martin, St. Mary, Iberia and St. Landry.

The district coincides with the United States "Atchafalaya District."

The district has a frontage on the right bank of the Mississippi River of 122.0 miles, extending from Torras to Donaldsonville; on Old River, of 6.0 miles; and on the Atchafalaya River, along its left bank, from Barbres to its mouth, of about 160.0 miles, and of about 120.0 miles on its right bank, extending from Bayou Courtableau to the mouth of the river, of which only about 44.0 miles of the left bank of the river, from Barbres to a point about two miles below Bayou Alabama, are yet leveed. The lengths of levee line in the district are as follows: On the Atchafalaya River, 43.9 miles; on Old River, 5.7 miles; on the Mississippi River, 121.5 miles, and on Bayou Lafourche, about 75.0 miles. Since December 10th, 1903, however, Bayou Lafourche has been separated from the Mississippi River, by the construction of an earthen dam (preliminary to the construction of locks), and, therefore, the bayou is no longer subject to the fluctuations which rendered a levee line necessary along its banks.

The affairs of the district are conducted by a Board of Commissioners, consisting of seven members, three of whom are appointed from the Mississippi River Parishes, three from the interior parishes and one at large on the recommendation of the railroads of the district.

The domicile of the district is at Port Allen, West Baton Rouge Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the districts, and possessions thereon.

Forced Contributions: Two and a half cents per acre on all land within the district; $60.00 per mile of railroad line; 25 cents per 1,000 pounds of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 4 cents per ton of cane when same is removed from the limits of the district, and beyond the limits of any district in the State; 25 cents per bale of cotton; 2 cents per 100 pounds of seed cotton, when same is removed from the limits of the district, and beyond the limits of any other levee district of the State; 1½ cents per sack of rough rice.

The authorized bonded debt of this district is $1,000,000.00, of which $850,000.00 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $24,897,127.00 and $25,148,951.00, respectively.

The amount and cost of the levee work done in the district during the past two years by the district, the State and the United States, is, approximately as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
ON THE MISSISSIPPI RIVER				
By the District	4.12	0.84	692,548	$115,681.59
By the State	1.78	1.08	327,671	56,301.00
By the United States	0.97	.....	265,189	50,915.74
Total	6.87	1.92	1,285,408	$222,898.33

ON THE ATCHAFALAYA RIVER.

By the District	1.97	5.33	521,884	$178,375.49
By the State	0.06	------	11,740	2,500.00
Total	2.03	5.33	533,624	$180,875.49

RECAPITULATION THROUGHOUT THE DISTRICT.

By the District	6.09	6.17	1,214,432	$294,057.08
By the State	1.84	1.08	339.411	58,801.00
By the United States	0.97	------	265,189	50,915.74
Total	8.90	7.25	1,819,032	$403,773.82

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done in the district, by the district, and by the State is as follows:

By the District	316,082 cubic yards	Amounting to $48,360.06
By the State	139,053 cubic yards	Amounting to 30,042.74
Total	455,135 cubic yards	Amounting to $78,402.80

This work is located about as follows: At Levert (upper and lower), Ascension-New Hope, Holloway to Sherman Bayou, Hudson and Haygood.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its line of levees generally, $11,205.39, and for protection work during high water only $4,724.25. The demand for expenditures for this character of work, during the present high water, however, will materially add to this.

The condition of the line of levee in this district, on the

Mississippi River, with regard to grade, is, at this time, about as shown in the following statement, viz:

PARISH	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	5 to 6 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
Pointe Coupee	0.2	1.7	34.1	14.1	50.1
West Baton Rouge	0.3	3.6	26.3	7.9	38.1
Iberville	1.0	0.4	24.6	2.0	28.0
Ascension	------	1.5	7.1	2.4	11.0
Totals	1.5	7.2	92.1	26.4	127.2
Percentages	1%	6%	72%	21%	

(Provisional grade recommended by the Mississippi River Commission: 4.3 at Red River Landing, and 4.2 at Donaldsonville, above high water.)

(4) *The Cat Island Levee District:* Situated in the Parish of West Feliciana. It comprises the territory on the East bank of the Mississippi River from Ratcliff's Landing to Bayou Sara. It was created by Act 110 of 1894, which provided for the appointment of five Levee Commissioners, and authorized the issuance of bonds to the amount of $100,000.00.

As stated in previous reports, surveys have shown that the cost of the levees necessary for the protection of this ditrict would be excessive as compared with the probable revenues, and that, even after building an effective levee system, the drainage of the district during prolonged periods of high water could only be maintained by the operation of costly pumping machinery. Under these circumstances, no action has ever been taken by the Commissioners for raising funds or for undertaking levee work.

(5) *The Pontchartrain Levee District:* Composed of the alluvial lands on the East bank of the Mississippi River, between the cities of Baton Rouge and New Orleans, consisting of parts of the Parishes of East Baton Rouge, Iberville, Ascension, St. James, St. John, St. Charles and Jefferson. Its situation is so favorable as to make it dependent for protection solely upon the integrity of its 126.1 miles of levee line on the Mississippi River front of the district, and upon its "Upper Protection" levee, extending from the main line of levee on the Mississippi River, back to the highlands.

The district is included in the United States "Pontchartrain District."

The affairs of the district are conducted by a Board of Commissioners consisting of nine members, one from each Parish in the district, and one representative, respectively, of the Illinois Central Railway Company, and of the Louisville, New Orleans & Texas Railway Company.

The domicile of the district is at Convent, St. James Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow, and possessions thereon.

Forced Contributions: Three cents per acre on all land other than that cultivated in sugar, cotton or rice (except swamp land subject to tidal overflow); 15 cents per barrel of sugar; 50 cents per hogshead of sugar; 5 cents per barrel of molasses; 3 cents per sack of rough rice; 50 cents per bale of cotton; 7½ cents per ton of sugar cane, grown in the district and removed therefrom before being converted into sugar; 4 cents per 100 pounds of seed cotton, grown in the district and removed therefrom; $100.00 per mile of main line of railroad.

The authorized bonded debt of the district if $1,000,000.00, of which $730,000.00 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of

Mississippi River, with regard to grade, is, at this time, about as shown in the following statement, viz:

PARISH	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	5 to 6 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
Pointe Coupee	0.2	1.7	34.1	14.1	50.1
West Baton Rouge	0.3	3.6	26.3	7.9	38.1
Iberville	1.0	0.4	24.6	2.0	28.0
Ascension		1.5	7.1	2.4	11.0
Totals	1.5	7.2	92.1	26.4	127.2
Percentages	1%	6%	72%	21%	

(Provisional grade recommended by the Mississippi River Commission: 4.3 at Red River Landing, and 4.2 at Donaldsonville, above high water.)

(4) *The Cat Island Levee District:* Situated in the Parish of West Feliciana. It comprises the territory on the East bank of the Mississippi River from Ratcliff's Landing to Bayou Sara. It was created by Act 110 of 1894, which provided for the appointment of five Levee Commissioners, and authorized the issuance of bonds to the amount of $100,000.00.

As stated in previous reports, surveys have shown that the cost of the levees necessary for the protection of this ditrict would be excessive as compared with the probable revenues, and that, even after building an effective levee system, the drainage of the district during prolonged periods of high water could only be maintained by the operation of costly pumping machinery. Under these circumstances, no action has ever been taken by the Commissioners for raising funds or for undertaking levee work.

(5) *The Pontchartrain Levee District:* Composed of the alluvial lands on the East bank of the Mississippi River, between the cities of Baton Rouge and New Orleans, consisting of parts of the Parishes of East Baton Rouge, Iberville, Ascension, St. James, St. John, St. Charles and Jefferson. Its situation is so favorable as to make it dependent for protection solely upon the integrity of its 126.1 miles of levee line on the Mississippi River front of the district, and upon its "Upper Protection" levee, extending from the main line of levee on the Mississippi River, back to the highlands.

The district is included in the United States "Pontchartrain District."

The affairs of the district are conducted by a Board of Commissioners consisting of nine members, one from each Parish in the district, and one representative, respectively, of the Illinois Central Railway Company, and of the Louisville, New Orleans & Texas Railway Company.

The domicile of the district is at Convent, St. James Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow, and possessions thereon.

Forced Contributions: Three cents per acre on all land other than that cultivated in sugar, cotton or rice (except swamp land subject to tidal overflow); 15 cents per barrel of sugar; 50 cents per hogshead of sugar; 5 cents per barrel of molasses; 3 cents per sack of rough rice; 50 cents per bale of cotton; 7½ cents per ton of sugar cane, grown in the district and removed therefrom before being converted into sugar; 4 cents per 100 pounds of seed cotton, grown in the district and removed therefrom; $100.00 per mile of main line of railroad.

The authorized bonded debt of the district if $1,000,000.00, of which $730,000.00 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of

1910 and 1911, was $10,958,993.00 and $11,091,519.00, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the district, the State and the United States, was approximately as follows, viz:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	0.31	0.51	93,094	$16,146.79
By the State	0.56	3.60	287,234	47,012.68
By the United States	1.53	2.95	382,307	61,110.98
Total	2.40	7.06	762,635	$124,270.45

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district is as follows:

By the District, 25,000 cubic yards, amounting to, $11,250.00.

This work is located as follows: From South Boulevard Street to protection Levee, Parish of East Baton Rouge.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, protection and preservation of its lines of levee generally, $11,184.91. No expenditures were incurred by the district, during the past two years, for protection work during high water, nor has any material amounts been so far so expended during the present high water.

The condition of the line of levee in this district, with regard to grade is, at this time, about as shown in the following statement, viz:

PARISH	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	5 to 6 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles.	
East Baton Rouge	0.8	10.7	2.6	14 1
Iberville	0.4	24.7	1.5	26.6
Ascension	0.2	18.8	----------	19.0
St. James	----------	23.1	----------	23.1
St. John	7.4	6.6	0.3	14.3
St. Charles	4.3	12.5	----------	16.8
Jefferson	9.9	1.7	----------	11.6
Totals	23.0	98.1	4.4	125.5
Percentages	18%	79%	3%	----------

(Provisional grade recommended by the Mississippi River Commission: 4.6 at Baton Rouge, and 4.0 at upper line of Orleans Parish, above high water.)

(6) *The Lafourche Basin Levee District:* Composed of all the alluvial lands, except the Parish of Orleans, lying between Bayou Lafourche, the Mississippi River and the Gulf of Mexico, and those parts of the Parishes of Ascension, St. James, St. John, St. Charles, Jefferson and Plaquemines, lying on the right or West bank of the Mississippi River, from Donaldsonville to the lower line of Riceland Plantation, and of the Parishes of Ascension, Assumption and Lafourche, lying on the left bank of Bayou Lafourche, from Donaldsonville to "Chere Ami Canal."

The lengths of the levee lines in this district are: On the Mississippi River, 119.8 miles; and on Bayou Lafourche, 74.1 miles. As in the case of the Atchafalaya Basin Levee District, the Lafourche Levee District is no longer directly subject to overflow from Bayou Lafourche, rendering a levee line along its banks unnecessary, so long as the dam at the head of the bayou, at Donaldsonville, is maintained, or locks be substituted therefor.

The district is included in the United States "Lafourche District," and part of the United States "Barataria District."

The affairs of the district are conducted by a Board of Commissioners, composed of nine members, one from each parish

or part of parish in the district, and one in the district at large, appointed on the recommendation of the railroads of said district.

The domicile of the district is at Gretna, Jefferson Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: 2½ cents per acre on all land; $100.00 per mile on all standard gauge line of railroad operated by steam, excepting railroads the total length of which in the State is less than 100 miles, upon which the rate shall be $50.00 per mile; 10 cents per barrel of sugar; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $15,525,858.00 and $15,653,837.00, respectively.

The amount and cost of the levee work done in the district, during the past two years, by the District, the State and the United States, is as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	0.20	0.98	24,341	$ 5,076.31
By the State	1.56	2.46	264,358	48,651.10
By the United States	1.08	0.52	112,045	13,425.82
Totals	2.84	3.96	400,744	67,153.23

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done, is as follows:

By the State, 93,216 cubic yards, amounting to $19,295.71.

This work is located as follows: At Parish Line to Belle Chasse Levee, Plaquemines Parish.

In addition to the above, the district, during the same period, expended in minor repairs and for the care, preservation and protection of its line of levee generally $17,849.35, and in protection work during high water $5,220.45. To the latter will be added a material sum for protection work during the present high water.

The condition of the line of levee in this district, with regard to grade, is, at this time, about as shown in the following statement:

PARISH	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	5 to 6 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	Miles	
Ascension	------	------	0.2	6.4	0.7	7.3
St. James	------	0.2	0.3	21.1	------	21.6
St. John	------	1.5	13.4	------	------	14.9
St. Charles	------	5.8	5.4	6.4	0.4	18.0
Jefferson	1.1	4.9	8 5	5.4	------	19.9
Plaquemines	2 7	12.7	14.9	5.0	------	35.3
Totals	3.8	25.1	42.7	44.3	1 1	117.0
Percentages	3%	21%	36%	39%	1%	------

(Provisional grade recommended by the Mississippi River Commission: 4.2 at Donaldsonville, 4.0 at New Orleans and 3.5 at Riceland above high water.)

(7) *The Orleans Levee District:* In response to the request of the Board of State Engineers, for information in regard to the operations of the Orleans Levee District, during the past two years, a report, under date of April 1st, 1912, was received from the Hon. Jules C. Koenig, President of the Board of Commissioners of the Orleans Levee District, which is so complete and comprehensive that the Board of State Engineers is pleased to reproduce it in full, as follows, viz:

"State of Louisiana.
"Office of the Board of Levee Commissioners,
of The Orleans Levee District,
"Suite No. 201, New Orleans Court Building.

"New Orleans, La., April 1st, 1912.

"Major F. M. Kerr, Chief State Engineer, City.

"Sir—The Board of Levee Commissioners of the Orleans Levee District has the honor to submit for your information the following report with accompanying appendices, covering the period from April 1st, 1910 to April 1st, 1912:

DUTIES AND PERSONNEL OF THE BOARD.

"The Board of Levee Commissioners of the Orleans Levee District was created by Act 93 of the General Assembly of the State of Louisiana, approved July 7th. 1890. Under the provisions of this act, the parish of Orleans was 'formed into a public levee district,' and a Board of Levee Commissioners composed of nine persons possessing all the requisites of a qualified elector in said parish, administer the affairs of the district, seven of whom are appointed by the Governor of the State from the several municipal districts of the City, and two (the Mayor and Commissioner of Public Works of the City of New Orleans) being ex-officio members of the Board.

"The said Board of Levee Commissioners is charged with the construction and repairs and invested with the control and maintenance of all levees in the said Orleans District, whether on river, lake, canal or elsewhere. The said Board of Levee Commissioners, as to location, construction and repairs of all levees on the river front of said district, shall first have the approval in writing of the State Board of Engineers.

LENGTH OF LEVEE LINES.

"The public levee lines of the district lie on both sides of the Mississippi River, that on the left or East bank being 12.09 miles, and that on the right or West bank 13.63 miles in length. The District also maintains lines of 'Rear Protection Levee' aggregating about 46.8 miles in length.

"The domicile of the Board is in the City of New Orleans;

at present it occupies suite No. 201, New Orleans Court Building, at the corner of Royal and St. Louis Streets.

GRADES OF LEVEES.

"Of the 12.09 miles of levee on the left, or east bank, 5.32 miles, or 44 per cent, of the line is 4 to 5 feet above the highest water of record, 1903; 3.85 miles, or 31.8 per cent, is 3 to 4 feet; 1.62 miles, or 13.4 per cent, is 2 to 3 feet; and 1.3 miles, or 10.8 per cent, is 1 to 2 feet.

"Of the 13.63 miles on the right, or west bank, 1.9 miles, or 14 per cent of the line is 4 to 5 feet above the highest water of record, 1903; 0.96 miles, or 7 per cent, is 3 to 4 feet; 5.22 miles, or 38 per cent, 2 to 3 feet; 4.85 miles, or 36 per cent, is 1 to 2 feet; 0.7 miles, or 5 per cent, is 0 to 1 foot.

"In consequence of the low grades and other defects of a more or less serious character, here and there, the Orleans Levee District, in response to public demand, some five years ago inaugurated a movement to improve and maintain as rapidly as possible its levee lines along the Mississippi River to the grades and sections as recommended at that time by the Board of State Engineers.

FORMULA OF THE BOARD OF STATE ENGINEERS.

"In general terms, this formula proposed an embankment of earth to be built and maintained to a grade not less than five (5) feet above the high water of 1903, with a crown not less than fifty (50) feet wide, river side slope not steeper than three horizontal to one vertical, and land side slope not steeper than ten horizontal to one vertical; the flattening of slopes and widening of crown beyond these limits to be governed by the special requirements of what is known as the 'Commercial Front,' on the left or east bank of the river. On the right or west bank of the river the levees to be raised and enlarged to a grade five (5) feet above the high water of 1903, with crown ten feet wide; river side slope not steeper than three horizontal to one vertical; land side slope not steeper than four horizontal to one vertical.

"Vide exhibits 'C-1' and 'C-2' following.

PROVISION OF FUNDS.

"To carry out this project, necessarily involved a large outlay of money for the payment of property appropriated. Since the inauguration of the movement on June 4th, 1907, brought about through the combined efforts of Hon. N. C. Blanchard, then Governor of the State, Hon. C. C. Cordill, State Senator, His Honor Martin Behrman, Mayor of the City of New Orleans, et als, to improve and maintain the line of levee along the Mississippi River protecting the City of New Orleans from overflow as rapidly as practicable, and to the extent of all available funds derived for this purpose, the summary will show, as per attached statement, that up to date some $4,523,078.79 has been expended, which amount is divided as follows:

"First—By contract work undertaken in construction and enlargement of certain stretches of the levee line on the Mississippi River, amounting to 1,668,718.5 cubic yards of earth, and 1,264,145 feet of creosoted revetment, at a cost of $994,971.28, which includes also $8,612.44 for the demolition of the H. T. Lawler Milling & Trading Co., Ltd. Concrete Fleur Mill.

Second—Maintenance, repair and operating expenses, approximately $361,478.09. Interest on bonds Approximating $543,300.00, and some $2,623,329.42 have been paid out for the purchase of property, which includes some $415,447.73 of outstanding certificates issued for appropriation of property, bearing five (5) per cent interest; so far averaging, as shown by the work undertaken since the inception of the project, nearly three times as much as the cost of the levee work itself.

"The district appealed to the General Assembly of the State of Louisiana in 1908, and succeeded in having its previous bonded indebtedness of $500,000.00 increased to $3,000,000.00, this amount is outstanding. The other sources of revenue are derived from the District tax authorized and permitted by law, which is an annual ad valorem tax of one mill on the dollar on all property subject to taxation in the district, and the annual allotment by the State of $10,000.00 from the General Engineer Fund. The assessed valuation of the district on the tax rolls of 1910 and 1911, was $231,045,937.00 and $233,383,437.00, respectively.

SUMMARY OF WORK DONE IN THE PAST TWO YEARS.

"From the tabulated statement in exhibits it will be seen that expenditures for levee purposes have during the past two years been as follows:

Earthwork: New Levee and enlargement, containing 503,776.0 cubic yards, and costing $166,099.40.

Revetment: 5,167 linear feet of revetment, amounting to 235,201 feet, B.M., and costing $15,200.44.

Maintenance and Repair: General maintenance and repair of levees, labor and material, and other expenses incidental to operation of Board, including salaries of employes $138,-376.22.

"Total expenditure, as above $319,676.06.

FUTURE WORK.

"Whilst the levees have been very much improved since the high water of 1908 considerable work yet remains to be done to bring the line up to grade and section as recommended by the Board of State Engineers, as shown in detailed attached statements, approximately at 2,296,200 cubic yards divided as follows:

Orleans Parish, Left Bank	1,635.00
Orleans Parish, Right Bank	661,200

"Whilst from these statements, it would appear on the surface, to be quite an undertaking, and evolving a large expenditure of money to complete this project of enlargement of the system of levees on the east bank of the river, the handling of earthwork by the use of mechanical devices has reduced the cost of actual levee work over fifty (50) per cent to what it was in the incipiency of the project in 1907. As we progress in our work, we are getting ahead of the Commercial front of the City, and property values to be appropriated in the future, which in the past has taken over three times the amount of money spent on actual construction work, will not in the future consume so heavily the revenues derived for this purpose. This however is based on a conjecture, that the banks of the river will remain permanent.

Bank Protection.

The urgency of the character of work required to protect the banks from caving, and to fix the harbor lines in the Port of New Orleans has long been admitted by the United States Government, and considerable work has been accomplished through appeals to the Government by her Commercial Bodies et als.

"Since the inauguration of this project by the Orleans Levee District, the United States Government has expended in revetments of the banks with sub-aqueous mattress work, some $707,000.00, distributed as follows:

Linear Feet of Bank Protected in New Orleans Harbor From 1907 to Date and Amounts Expended.

	Expended.
Season 1907-1908—	
1,570 lin. ft. protected at Amesville;	
900 lin. ft. protected at Third District Reach	$100,000.00
Season 1908-1909—	
5,937 lin. ft. protected at Third District Reach	150,000.00
Season 1909-1910—	
3,955 lin. ft. protected at Carrollton Bend	100,000.00
Season 1910-1911—	
2,765 lin. ft. protected at Gretna Front;	
3,975 lin. ft. protected at Carrollton Bend;	
1,110 lin. ft. protected at Third District Reach	175,000.00
Season 1911-1912—	
3,090 lin. ft. protected at Third District Reach;	
600 lin. ft. protected at Carrollton Bend;	
2,215 lin. ft. protected at Gretna to Algiers Point;	
2,480 lin. ft. protected at Greenville Bend	182,000.00
Total	$707,000.00

"The Board of Levee Commissioners of the Orleans Levee District have repeatedly announced that if the National Government will undertake the task of bank protection, the District will construct and maintain all the levee lines required. To do this work effectually would require an annual expenditure of $300,000.00 by the United States Government, as recommended by its Corps of Engineers, until the project of bank portection and fixing the harbor lines is completed.

"Very respectfully,

(Signed) Jules C. Koenig, President,

Board of Levee Commissioners of the

Orleans Levee District."

"B,"

Statement comparing elevation of levee lines in the Orleans Levee District with the highest water of record.

	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	Total Length	Cubic yards required to conform to grade and section prescribed by Board of State Engineers.
	Miles	Miles	Miles	Miles	Miles	Miles	
Orleans Parish, Left Bank	------	1.30	1.62	3.85	5.32	12.09	1,635,000
Orleans Parish, Right Bank	.70	4.85	5.22	.96	1.90	13.63	661,200
Total	.70	6.15	6.84	4.81	7.22	25.72	2,296,200
Percentages:							
Left Bank	------	10.8%	13.4%	31.8%	44%	------	
Right Bank	5%	36%	38%	7%	14%	------	

GRADES.

Grade and Section Recommended by the Board of State Engineers.

Grade: Five (5) net, above high water of 1903.

Section: Left bank crown not less than 50 feet wide; river side slope not steeper than 3 to 1; land side slope not steeper than 10 to 1.

Right bank, crown not less than 10 feet wide, river side slope not steeper than 3 to 1; land side slope not steeper than 4 to 1.

EXHIBIT C-1.

State of Louisiana.
Office, Board of Levee Commissioners of Orleans Levee District.
New Orleans, La., April 1st, 1912.

Statement showing approximate elevation of levees, above highest water in Orleans Levee District, left or east bank of the Mississippi River; also, approximate quantities of earthwork required to place said line to the Board of State Engineer's grade, which is 5 feet above the highest water (1903), with crown 50 feet wide and slopes 3 to 1 river-side and 10 to 1 land side.

LOCALITY	Linear Feet	Feet Above H. W. 1903	Crown 50 Feet Cubic Yards	REMARKS
Upper Protection Levee to Upper Line of Audubon Park	10,382	5	200,000	Completed 10 Ft. Crown
Upper Line of Audubon Park to Joseph Street	6,052	5	120,000	Completed 10 Ft. Crown.
Joseph St. to Napoleon Ave.	5,900	4	339,000	
Napoleon Ave. to Louisiana Ave.	4,570	1	70,000	
Louisiana Ave. to St. Mary St.	6,529	3	105,000	
St. Mary St. to Canal St.	9,000	1.5 to 3	120,000	
Canal St. to Barracks St.	4,780	1.5 to 2.5	132,000	
Barracks St to Port St.	1,960	3	22,000	
Port St. to Montegut St.	1,080	3	11,000	
Montegut St. to Louisa St.	1,240	3 to 5	20,000	
Louisa St. to Kentucky St.	3,816	5	----------	Completed 50 Ft. Crown.
Kentucky St. to Egania St.	3,580	2.5 to 3	233,000	
Egania St. to Parish Line	4,337	3 to 5	263,000	
Total	63,826	----------	1,635,000	

C-2.

State of Louisiana,
Office, Board of Levee Commissioners of
Orleans Levee District.
New Orleans, La., April 1st, 1912.

Statement showing approximate elevation of levees above highest water in the Orleans Levee District, right or west bank; also approximate quantity of earth required to place said line to the Board of State Engineer's grade, which is 5 feet above the highest water (1903) with crown 10 feet and slopes 3 and 4 to 1.

NAME OF LEVEE. Station to Station.	Linear Feet.	Feet Above H. W. 1903.	Cubic Yards.
Parish Line to Newton Street—			
0 to 21	2,100	2	34,400
Newton Street to Alix Street—			
21 to 34+25	1,325	2	18,800
Alix Street to Pelican Avenue—			
34+25 to 38+45	420	3	2,500
Pelican Avenue to Morgan Avenue—			
38+45 to 51+16	1,271	2	11,500
Morgan Avenue to Bermuda Street—			
51+16 to 58+77	761	3	4,700
Bermuda Street to Algiers Sawmill—			
58+77 to 65+10	633	2	5,000
Algiers Sawmill—			
65+10 to 68+75	365	½	4,000
Algiers Sawmill to S. P. R. R. Yards—			
68+75 to 75+35	660	3	3,800
Southern Pacific Railroad Yards—			
75+35 to 111+80	3,645	½	41,000
S. P. R. R. Yards to United States Naval Station—			
111+80 to 119+40	760	2	7,400
United States Naval Station—			
119+40 to 156+90	3,750	4	.....
U. S. Naval Station to McLellanville—			
156+90 to 175	1,810	2	20,300
McLellanville—			
175 to 192	1,700	3	22,000
Convent Place to Esnard Place—			
192 to 242	5,000	2½	55,400
Aurora—			
242 to 309+83	6,783	3	63,800

EXHIBIT 2-C—Continued.

NAME OF LEVEE. Station to Station.	Linear Feet.	Feet Above H. W. 1903.	Cubic Yards.
Cut-Off—			
309+83 to 330	2,017	1½	21,800
Orleans—			
330 to 412+55	8,255	3	*88,700
Couret Place—			
412+55 to 426+05	1,350	4	11,900
Upper Stanton—			
426+05 to 441+03	1,498	3	18,400
Stanton—			
441+03 to 489+56	4,853	1½	58,700
Shamrock—			
489+56 to 511+56	2,200	3	18,500
Delacroix—			
511+56 to 608+69	9,713	1½	115,200
Lower Delacroix to Upper Beka—			
608+69 to 642+78	3,409	5	11,500
Beka—			
642+78 to 653+31	1,053	2	2,000
Lower Beka New Levee—			
653+32 to 719+63	6,632	5	19,900
Totals	71,963		661,200

*Caving bank; new line of levee in time will be required, approximating 600,000 cubic yards of earth, unless the bank is protected by U. S. Government.

(8) *The Lake Borgne Basin Levee District:* Composed of the alluvial lands on the east bank of the Mississippi River below the City of New Orleans, situated in the Parish of St. Bernard, and in that part of Plaquemines Parish lying North of the lower line of Bohemia Plantation.

The district is included in the United States "Lake Borgne District."

The length of the levee line of this district, all fronting on the Mississippi River, is 48.0 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of three members, one from each Parish in the district, and one representative of the New Orleans and Southern Railroad Company.

The domicile of the district is at New Orleans, La.

The district taxes and forced contribuitons permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of ten mills on the dollar on all alluvial lands subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents on each and every acre of land within the limits of the district susceptible to cultivation; $60.00 per mile of railroad line; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 10 cents per barrel of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges produced in said district; 1½ cents per barrel of oysters gathered from the waters within the limits of the district.

The authorized bonded debt of the district, all of which is outstanding, is $100,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $4,349,110 and $4,938,028.00 respectively.

The amount and cost of the levee work done in this district, during the past two years, by the district, the State and the United States, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee	Levee Raised and Enlarged		
By the District	0.54	1.63	54,115	$10,530.65
By the State	1.51		130,139	25,307.89
By the United States	1.21	1.76	178,304	15,054.40
Totals	3.26	3.39	362,558	$50,892,94

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done is as follows:

By the State, 29,543 cubic yards, amounting to $5,527.54.

This work is located as follows: At Linwood, in Plaquemines Parish.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its line of levees generally $51,211.92, and for protection work during high water only $3,883.24. The demand for expenditures for this character of work, during the present high water, however, will materially add to this.

The condition of the line of levee in this district, with regard to grade, is, at this time, about as shown in the following statement:

PARISH	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	Miles	
St. Bernard	0.1	1.6	7.1	2.0	------	10.8
Plaquemines	1.2	6.0	19.4	9.7	0.9	37.2
Totals	1.3	7.6	26.5	11.7	0.9	48.0
Percentages	3%	16%	55%	34%	2%	------

(9) *The Grand Prairie Levee District:* Composed of the alluvial lands subject to overflow on the left bank of the Mississippi River, embraced within the Parish of Plaquemines, from the lower line of Bohemia Plantation to the lower line of Baptiste Collette Gap.

The district is included in the United States "Lake Borgne District."

The length of the levee line in this district is 31.6 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Point-a-la-Hache, Plaquemines Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of ten mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: One dollar on every arpent front of land within the district facing the Mississippi River; $30.00 per mile of standard gauge of railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of esculents; 5 cents per barrel of oranges produced within the limits of the district, and 3 cents per barrel of oysters gathered from the waters of the district.

The authorized bonded debt of the district, all of which is outstanding, is $30,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $200,790.00, and $211,210.00, respectively.

The amount and cost of the levee work done in the district, during the past two years by the State and the United States, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	0.75	1.96	86,836	$30,203.91
By the United States		1.69	38,609	39,875.81
Totals	0.75	3.65	125,445	$70,079.72

By the State, 29,543 cubic yards, amounting to $5,527.54.

This work is located as follows: At Linwood, in Plaquemines Parish.

In addition to the foregoing, the district, during the same period, expended in minor repairs, and for the care, preservation and protection of its line of levees generally $51,211.92, and for protection work during high water only $3,883.24. The demand for expenditures for this character of work, during the present high water, however, will materially add to this.

The condition of the line of levee in this district, with regard to grade, is, at this time, about as shown in the following statement:

PARISH	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	4 to 5 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	Miles	
St. Bernard	0.1	1.6	7.1	2.0	.....	10.8
Plaquemines	1.2	6.0	19.4	9.7	0.9	37.2
Totals	1.3	7.6	26.5	11.7	0.9	48.0
Percentages	3%	16%	55%	34%	2%	.....

(9) *The Grand Prairie Levee District:* Composed of the alluvial lands subject to overflow on the left bank of the Mississippi River, embraced within the Parish of Plaquemines, from the lower line of Bohemia Plantation to the lower line of Baptiste Collette Gap.

The district is included in the United States "Lake Borgne District."

The length of the levee line in this district is 31.6 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Point-a-la-Hache, Plaquemines Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of ten mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: One dollar on every arpent front of land within the district facing the Mississippi River; $30.00 per mile of standard gauge of railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of esculents; 5 cents per barrel of oranges produced within the limits of the district, and 3 cents per barrel of oysters gathered from the waters of the district.

The authorized bonded debt of the district, all of which is outstanding, is $30,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $200,790.00, and $211,210.00, respectively.

The amount and cost of the levee work done in the district, during the past two years by the State and the United States, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	0.75	1.96	86,836	$30,203.91
By the United States		1.69	38,609	39,875.81
Totals	0.75	3.65	125,445	$70,079.72

The district expended some amounts, in addition to the foregoing, in minor repairs, and for the care, preservation and protection of its line of levee, but no statement in regard to this has been received.

The condition of the line of levee in this district, with regard to grade, is, at this time, about as shown in the following statement, viz:

PARISH	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
Plaquemines	4.0	---	14.9	12.7	31.6
Percentages	13%	---	47%	40%	---

(Provisional grade recommended by the Mississippi River Commission: 3.0 above high water of 1903 at Bohemia, and 3.0 above high water of 1907 at Fort St. Philip.)

(10) *The Buras Levee District:* Composed of the alluvial lands subject to overflow on the right or West bank of the Mississippi River, " in the Parish of Plaquemines, South of a line drawn from the lower line of Riceland Plantation to the limits of Harang Canal on Bayou Lafourche," extending to The Jump.

The district is included in the United States "Barataria District."

The length of the levee line in this district is 33.6 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Buras, Parish of Plaquemines, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district, and possessions thereon.

Forced Contributions: Five cents per acre on all land susceptible of cultivation within the limits of the district; $30.00 per mile of standard gauge of railroad; 25 cents per bale of cotton; 5 cents per ton of cane; 5 cents per sack of rough rice; 2½ cents per barrel of oysters; 2½ cents per bushel of esculents, and five cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $35,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $757,480.00 and $756,370.00, respectively.

The amount and cost of the levee work done in the district during the past two years, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	1.57	0.46	52,986	$24,957.02
By the United States	0.69	2.20	76,977	9,213.54
Totals	2.26	2.66	129,963	$34,170.56

In addition to the foregoing, the district has expended in minor repairs, and for the care, protection and preservation of its line of levees $11,765.47, and in protection work during high water $1,232.65. In addition to this, the high water of 1912 will impose upon the district considerable expenditures, which it is, at this date, impossible to estimate.

The condition of the line of levee in this district, with regard

to grade, is, at this time, about as shown in the following statement:

PARISH	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
Plaquemines	4.1	9.2	8.5	11.8	33.6
Percentages	12%	27%	26%	35%	

(11) *The Plaquemines Parish East Bank Levee District:* Consists of all the territory contained within the Parish of Plaquemines, on the left or East bank of the Mississippi River, beginning at the upper line of Harlem Plantation and extending to the upper bank of Cusilich Canal, on the property of Peter Cusilich, below the Old Quarantine Station. It is entirely included within the limits of the Lake Borgne Basin Levee District and the Grand Prairie Levee District, so that all parts of it are also parts of another levee district. In this respect, as well as having been constituted "for the purpose of protecting the lands of said district from inundation from the waters of the Gulf of Mexico," the Plaquemines Parish East Bank Levee District differs from any of the levee districts of the State previously created.

The affairs of the district are conducted by a Board of Commissioners, consisting of five members.

The domicile of the district is at Pointe-a-la-Hache, Parish of Plaquemines, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of "10 mills on the dollar of the assessed valuation" of the district. Should this tax prove in-

adequate, the district is further permitted "to levy annually a district tax not to exceed 50 mills on the dollar, on its assessed valuation," provided "that the said Board of Commissioners shall, in accordance with Article 239 of the Constitution of 1898, first submit, without any previous petition, the purpose for the proposed increased levy, and the length of time the same shall be levied, to a vote of the property taxpayers of said district," etc.

Forced Contributions: One dollar per acre on all lands in the district protected from inundation, lying between the Mississippi River and the Gulf Coast levees; $30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of vegetables and fruits other than oranges; 5 cents per barrel of oranges.

The authorized bonded debt of the district, all of which is outstanding, is $155,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $249,750.00 and $233,850.00, respectively.

The amount and cost of levee work done in the district, during the past two years by the district and the State, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	5.29	1.37	190,936	$25,065.92
By the State	0.06	22.30	201,203	40,258.64
Total	5.35	23.67	392,139	$65,324.56

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district is as follows:

By the State, 5,050 cubic yards, amounting to $1,085.75.

The work is located as follows: On Gulf Coast Levee Plaquemines Parish.

The damage done to the Gulf Coast Levee, during the storm of 1909, as described in the bi-ennial report of the Board of State Engineers, April 20th, 1910, has practically been fully remedied. In fact, but for a few sloughs, here and there, which have occurred since the levee has been restored, and will be corrected as soon as practicable, the levee, as far as the earthwork is concerned, may be regarded as completed as designed.

(12) *The Caddo Levee District:* All alluvial land, and all lands subject to or liable to overflow from the waters of Red River, or its tributaries, or its outlets, situated in the Parish of Caddo, not including such lands as occur within the corporate limits of the City of Shreveport, are embraced within the boundaries of this district.

The length of the levee lines in the upper and lower systems of this district aggregate 86.3 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of seven members.

The domicile of the district is at Shreveport, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents per acre on all land within the district; $60.00 per mile of railroad; and 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000.00, of which $247,500.00 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of

1910 and 1911, was $1,114,620.00 and $1,245,975.00, respectively.

The amount and cost of the levee work done in the district during the past two years, by the district was as follows:

WORK DONE	Miles of		Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	5.25	2.11	410,173	$58,026.69
Total	5.25	2.11	410,173	$58,026.69

The amount and cost of levee work, remaining, at this time, under existing-contracts, to be done in the district, is as follows:

By the District, 285,920 cubic yards, amounting to $39,944.64. This is located at Cuba to Mulhaupt, and Twelve Mile Bayou to Cross Bayou.

There were no expenditures in this district, for repair work, etc., during the past two years.

The general condition of the levee lines in this district is, at this time, good, though more attention to preservation, care and maintenance is necessary. Again, quite a length of line, from the State line down to a point below Dooley Bayou, has, in consequence, of an impending increase in future flood levels, along that part of Red River, by reason of the ultimate leveeing up of Red River, in Arkansas, been recommended by the Board of State Engineers. This recommendation, involving the construction of some 900,000 cubic yards of earthwork, the Caddo Levee District has accepted, the surveys have been made by the Board of State Engineers, and proposals, to be received up to 12 o'clock noon, Wednesday, April 24th, 1912, to construct the work, invited by advertisement.

The district has also in contemplation, as a part of the plan under which the new levee from Cuba to Mulhaupt places, and from the westerly bank of Twelve Mile Bayou to Cross Bayou, already under construction, the excavation of a drainage channel from Twelve Mile Bayou about opposite the lower end of Gilmer's Ditch, to Cross Bayou, as a substitute for Twelve Mile Bayou when the latter, under authority from the United States, may be closed at its present entrance into Red River. This work will add some 1,500,000 cubic yards of earthwork to that already practically under way by the district at this time.

(13) *The North Bossier Levee District:* All the alluvial lands subject to overflow from the waters of Red River or its tributaries or outlets, in the Parish of Bossier, bounded on the North by the Arkansas-Louisiana State line, on the East by the hills or uplands, on the South by the Southern boundary of Section Nine (9), Ten (10), Eleven (11) and Twelve (12) of Township Twenty-two (22) North, Range Fourteen (14) West, and on the West by Red River, are embraced with in the boundaries of this district.

The control and management of the district is vested in a Board of Commissioners, consisting of five members.

The domicile of the district is at Plain Dealing, Bossier Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: A district levee tax of 10 mills on the dollar of the assessed valuation of all the property in the district subject to taxation for levee purposes.

Forced Contributions: Fifteen cents per acre on all land; $100.00 per mile of railroad lines; $1.00 per bale of cotton.

The authorized bonded debt of the district, none of which is as yet outstanding, is $200,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911, was $29,820.00 and $27,270.00, respectively.

No levee work has yet been undertaken in this district, by the district or the State, due to the fact that its Board of

Commissioners is waiting upon the Long Prairie Association of Arkansas to complete its system down to the State line. The North Bossier Levee District, owing to its location and geographical configuration, naturally forms the lower end of a levee district which should have its head at Long Prairie, in Arkansas, and its lower end at Posten Bayou, in Louisiana. But the fact that part of the district was in one State and part in another, precluded the practicability of forming it into one levee district. This was especially so as that part in Louisiana (the lower end) is much the smaller. An understanding has, however, been reached to the effect that just as soon as the Arkansas district completes a continuous system from the highlands at Long Prairie down to the Louisiana line, the North Bossier Levee District will take up the work and continue the levee on down as far as its resources will permit.

This condition has not yet been brought about.

(14) *The Bossier Levee District:* All alluvial lands subject to or liable to overflow from the waters of Red River, or its tributaries or outlets in the Parish of Bossier, South of the line dividing the North half from the South half of Township 29 North, are embraced within the boundaries of the district.

The length of the levee line in this district is 48.0 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of seven members.

The domicile of the district is at Bossier City, Bossier Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the district and possessions thereon.

Forced Contributions: Five cents on every acre of land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $400,000.00, of which $350,000.00 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1910 and 1911 was $1,792,125.00 and $1,762,570.00, respectively.

The amount and cost of the levee work done in the district during the past two years, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the State	0.71		49,364	$6,165.56
Total	0.71		49,364	$6,165.56

Preservations, care and maintenance, in the Bossier Levee District, for some years past, attributable to lack of funds has not received the necessary attention. Otherwise, the district could be said to also possess a good line of levee.

Funds to inaugurate and carry on a systematic and comprehensive plan of operations, to preserve, care and maintain the lines of levee in the Bossier Levee District, are imperatively needed, to check a tendency to material impairment which cannot, otherwise, fail to result.

(15) *The Red River, Atchafalaya and Bayou Boeuf Levee District:* Under the act of incorporation of this district, all the territory in the Parishes of Rapides and Avoyelles, and in that part of the Parish of St. Landry, situated between the Atchafalaya River on the East, and Bayous Boeuf and Courtableau on the West and South, is subject to its operations.

During the years 1890 and 1891, however, by due process of law, all that section of Rapides Parish, above Alexandria, bounded by Bayous Rapides and Jean de Jean and Red River, and all parts of the Parish of Avoyelles, situated on the left bank of Red River, as well as that part of the parish bounded by Bayou des Glaizes, the Atchfalaya and Red Rivers, and the public road running from David's Ferry, on Red River, to Bayou des Glaizes by way of Marksville, Mansura and the

"Long Bridge," at Bout de Bayou, have been exempted from the operations of the act of incorporation of the district.

The lengths of the lines of levee in the three systems in this district aggregate 130.7 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of three members, one from each Parish in the district.

The domicile of the district is at Alexandria, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all lands and other property in the district subject to taxation for levee purposes.

Forced Contributions: Five cents per acre on all land in the district; $60.00 per mile of railroad.

The authorized bonded debt of the district, all of which is outstanding, is $500,000.00.

The assessed valuation of the district, on the tax rolls of 1910 and 1911 was $7,894.950.00 and $7,928,525.00 respectively.

The amount and cost of the levee work done in the district, by the district and the State, during the past two years, was as follows:

WORK DONE	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
By the District	1.97	.....	208,344	$45,597.88
By the State	8.99	2.47	402,850	80,897.37
Total	10.96	2.47	611,194	$126,495.25

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the district, is as follows:

By the District	113,811 cubic yards	Amounting to $24,728.42
By the State	56,500 cubic yards	Amounting to 12,430.00
Total	170,311 cubic yards	Amounting to $37,158.42

This work is located as follows: On the Latanier Extensions, and on the Elba Levee.

During the past two years, this district expended in minor repairs, and for the care, preservation and maintenance of its lines of levee $4,748.74, but, until the present high water, nothing for protection during high water. However, it has been and will continue to be called upon during this high water for considerable expenditures for such work on the Atchafalaya River.

The condition of the present maintaining lines of levees in this district is generally good. Improvement in grade and section, along certain stretches, is desirable, but few new levees seem, at this time, to be called for in the near future. Such as are, say at Cut-Off Bayou and Wilsons, on Red River in Rapides Parish, and at Elba on the Atchafalaya River, in St. Landry Parish, have been provided for, the two former by the State, and the latter by the district.

However, considerable work in the form of extensions to existing systems, still remains to be executed, the principal of these being along the South bank of Bayou Rapides, from the Cooper Place to McNutt's Hill, some 12.0 miles, and along the West bank of the Atchafalaya from a point about two miles above Bayou Courtableau, where the system now, for the time being, practically terminates, to Bayou Courtableau, involving some 250,000 cubic yards and 100,000 cubic yards of earthwork respectively.

(16) *The Red River and Bayou des Glaizes Levee and Drainage District:* All lands in the Parish of Avoyelles, situated between Red River, the Atchafalaya River, Bayou des Glaizes and the public road running from David's Ferry or Moncla's

Ferry, on Red River, to Bayou des Glaizes, by way of Marksville, Mansura and the "Long Bridge" at Bout de Bayou, subject to overflow, are included in this district.

The length of the levee line in this district is, at this time, 27.0 miles.

The affairs of the district are conducted by a Board of Commissioners consisting of three members.

The domicile of the district is at Marksville, Avoyelles Parish, La.

The district levee taxes and forced contributions permitted by law to be annually levied and collected in the district, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar upon all of the property in the district subject to taxation for levee and drainage purposes.

Forced Contributions: Five (5) cents per acre on all land in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000.00, all of which is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1910 and 1911 was $697,300.00 and $663,040.00, respectively.

The amount and cost of the levee work done in the district during the past two years was as follows:

WORK DONE	Miles of New Levee Built	Cubic Yards of Earthwork	COST
By the District	4.0	336,208	$84,052.00
Total	4.0	336,208	$84,052.00

During the past two years the district expended nothing in minor repairs and for the care, protection and preservation of its lines of levees, nor in protection work during high water. However, during the present high water, it will be called upon for some such expenditures.

The condition of the line of levee in this district, as far

as completed, is good. At the present date, the completed line extends down to a point 27.0 miles below its head, leaving extensions of 43.0 miles and 5.0 miles, downstream, on the Red River and Atchafalaya River, estimated to require some 3,000,00 cubic wards of earthwork for the construction to reach the mouth of Bayou des Glaizes, at Simmsport.

Here, it remains to be determined whether the line should, preferably, be extended across Bayou des Glaizes, and connected with the present controlling system in the Red River, Atchafalaya and Bayou Boeuf Levee District, below, or up Bayou des Glaizes to some point superior in elevation to back water from the Atchfalaya River.

In the first instance, the main arteries for drainage in the valley, above, would have to be diverted into new channels, and the drainage system South of Bayou des Glaizes greatly improved. Both very desirable.

In the second, the Red River and Bayou des Glaizes Levee and Drainage District, would be deprived of all effective drainage except such as could be obtained by pumping. This should, if possible, be avoided.

The necessity for seriously discussing the situation is, however, still far distant.

In addition to the extensions described, a new levee, in consequence of caving banks, involving the construction of 80,000 cubic yards of earthwork is, at this time, required opposite Ben Ruth Lake, about 6.0 miles below David's or Moncla's Ferry, the head of the system.

The situation at this point is one which should appeal for bank protection work rather than the construction of a new levee, and an endeavor will be made to induce the United States to undertake the bank protection work needed there.

The necessity for bank protection work rather than the construction of a new levee, arises from the fact that the Avoyelles Prairies, at this point, approach within a short distance of the banks of Red River, Ben Ruth Lake, and a very narrow strip of land only, lying in between. So that the new levee would have to be built in the bed of the lake, where the foundation is uncertain, the levee would be of considerably greater height than the present controlling line, and the cost would be beyond the resources of the local levee authorities.

(17) *The Saline Levee and Drainage District:* All the territory in Avoyelles Parish, consisting of the alluvial lands subject to overflow within the following limits, is embraced within the district, to-wit: Beginning at Cassandria on the line between Sections 44 and 50, Township 3 North, Range 3 East, thence down Red River to Saline Bayou, thence following Saline Bayou, Saline Lake and Horse Pen Creek to line between Sections 17 and 18, Township 4 North, Range 3 East, thence South to the Point Maigre hills, and following the East edge of said hills to the point of beginning.

The length of the line of levee in this district is, at this time, 10.3 miles.

The affairs of the district are conducted by a Board of Commissioners, consisting of three members.

The domicile of the district is at Marksville, Avoyelles Parish, La.

The district taxes and forced contributions permitted by law to be annually levied and collected in the district are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar upon all the property in the district subject to taxation for levee and drainage purposes.

Forced Contributions: Five cents per acre on all lands in the district; $60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the district is $300,000.00, of which $100,000.00 is, at this time, outstanding.

The assessed valuation of the district, on the tax rolls of 1910 and 1911 was $129,220.00 and $132.730.00, respectively.

The amount and cost of the levee work done in the district during the past two years was as follows:

WORK DONE	Miles of New Levee Built	Cubic Yards of Earthwork	COST
By the State	3.50	80,285	$11,632.06
Totals	3.50	80,285	$11,632.06

The amount and cost of levee work still remaining, at this time, under existing contracts to be done in the disriet, is as follows:

By the State, 25,956 cubic yards, amounting to $3,893.40.

This work is located at Experiment Plantation South, Avoyelles Parish La.

Practically the entire length of line in the district still requires improvement in grade and section. The line should also, as soon as practicable, be extended to at least the lower limits of the district on Red River, at or near the mouth of Saline Bayou, some 7.0 miles below the present terminus of the line.

The district has, during the past two years, practically made no expenditures for the care, preservation and maintenance of its line of levee.

Immediate and Future Needs of the Levee Districts.

It will be noted in the foregoing description of the levee districts of the State, that the estimates of the further enlargement of the controlling lines of levee, and of the new levees required in each, usually given, are herein omitted.

This is due to the fact that an unprecedented period of high water, in nearly all the streams of the State prevails, at this time, and the Board of State Engineers, has deemed it advisable to with-hold the preparation and submission of such estimates until after the subsidence of high water, when the esimates may be made to more nearly conform to the existing conditions.

A special supplemental report will, therefore, as soon as justified, follow this report.

The Levee Situation Generally on the Mississippi, Red and Atchafalaya Rivers.

On The Mississippi River.

A review of the condition of the lines of levees, within their present limits, in the several levee districts in Louisiana fronting upon the Mississippi River, as already set forth, under the name of each district, shows, in most directions, continued

improvement, in location, grade, section and character of work performed. Nevertheless, it must still be recognized that, while quite a degree of excellence has been reached on many parts of the system, much yet remains to be accomplished before it can, as a whole, be regarded as in all respects adequate.

As long as the banks of the Mississippi River along its numerous concave bends, are permitted, season after season, to crumble in and carry away long lines of levee, no matter how well located, nor how ideally constructed, and destroy vast areas of property as well, the end of its requirements will never be in sight.

Besides this, from the economic point of view, bank protection work may be said to become more and more imperative in proportion to the degree of improvement accomplished in the levee system itself. The higher the standard to which the levees are constructed, the greater the loss when destroyed by caving banks.

Bank protection work, by the United States, has passed beyond the stage of experiment. It has proven an unqualified success wherever applied. Much of it has already been done by the United States on the Mississippi River in Louisiana. However, much more extended effort is still required in many directions, until the banks of this mighty river are made generally stable, the completion of the levee system, in the course of a limited time, thereby made possible, and the burden of providing for protection from overflow reduced to the simpler problem of preservation, care and maintenance.

The question of bank protection proper applies more seriously and generally to what is commonly called the "Upper River," that is, on the Mississippi River, above the mouth of Red River, though a number of places on the "Lower River," that is, on the Mississippi River below the mouth of Red River, appeal for similar treatment, and some of them have already received such treatment, notably at Plaquemines City, in Iberville Parish, and in the harbor of New Orleans.

On the "Lower Coast," or that part of the Mississippi River below New Orleans, and between there and the Gulf of Mexico, materially receding river banks are comparatively speaking of rare occurrence, but another form of exposure in

high water confronts the river banks and levees on both sides of the river practically throughout its greater length from New Orleans to the Gulf.

This results from waves caused by winds and storms, and by the numerous large ocean going vessels plying up and down the river. None but those who have witnessed the force and effect of this action upon the banks of the river and the levee lines paralleling them, can realize its seriousness, and the great necessity for works of protection to guard against it.

Thus, as stated before, where the lines of levees on the "Lower Coast" are thus exposed, wooden revetments are, where practicable and the means available, built and maintained by the State and levee districts, in connection with levee work, while the United States, under similar circumstances, covers the entire river side slope of such levees as are undertaken under its direction, with a layer or pavement of concrete. This entails upon the part of all three very considerable outlays.

On Red River.

The length of Red River in Louisiana, that is, from the Arkansas State line to Old River, is 367.0 miles. Of this length, however, but 250.0 miles, distributed between both banks, has so far been leveed by the authorities; that is, 101.0 by river, in the Caddo Levee District, on the right bank; 61.0 miles in the Bossier Levee District opposite, on the left bank; 75.0 miles in the Red River, Atchafalaya and Bayou Boeuf Levee and the Red River and Bayou des Glaizes Levee and Drainage Districts, on the right bank, and 13.0 miles in the Saline Levee and Drainage District opposite, on the left bank. That is, the upper and lower limits of Red River only have so far received the benefits of levee construction by the State and levee districts, leaving several large stretches of river, and adjacent country in between, where protection from overflow would prove of immense value, still untreated. This is largely due to the fact that riparian owners in this section have not yet availed themselves of the opportunity permitted under the laws of the State to organize into levee districts and obtain the benefits of State aid to which they would thereby be entitled. A great deal of levee work is therefore still needed on Red River.

Except for some lack of system and comprehensiveness, in the work of the local authorities, here and there, on Red River, in preserving, caring for and maintaining their lines of levees, the latter are, as far as they extend, in good and effective condition.

Red River, like the Mississippi River, also suffers greatly from caving banks. This condition is intensified by its extreme tortuousness, numerous cut-offs, steepness of slope, and, where confined, to the enlargement of section consequent upon confinement.

In the interest of navigation, preservation of riparian lands, and protection from overflow, at large, bank protection work on Red River should be seriously considered and provided for at as early a time as possible.

In fact, the necessity for the consideration of this, and numerous other features connected with the development, control and preservation of Red River as a water-way, in Louisiana and elsewhere in the valley, is growing so patent and urgent as to seem to call for a National Red River Commission, along the same lines as govern with the Mississippi River Commisison.

No comprehensive plan of operation for the benefit of the valley as a whole can well be ever otherwise formulated and carried out, and without such a plan, not only will no material advance in public improvement in the valley as a whole, be likely, but, comparatively speaking, much of the work, here, there and elsewhere, spasmodically done, as occasion permits, with meagre resources, National and local, will continue to be subject to certain waste, through efforts, necessarily more or less tentative and lacking in sequence. Many plans, which, for the time being, may appear, locally, appealing, may equally prove seriously conflicting to the valley at large, when, if ever, the attempt might be made to assemble them into one grand whole.

On The Atchafalaya River.

The Atchafalaya River, from its head, at Barbres Landing, to its mouth, at the Gulf of Mexico, has a length of about 160 mlies. Of this, but 41.0 miles, on the right or West bank, from Simmsport to and across Bayou Bigraw, and 45.5 miles, on the left or East bank, by river, have so far been leveed.

The levees so far built upon the Atchafalaya River are, with few exceptions, in excellent condition.

It is contemplated by the levee authorities to, as rapidly as resources will permit, extend the levee line on the right or West bank of the Atchafalaya River, some 75 miles, on a location practically paralleling the river, to a point on the banks of Bayou Teche, probably, if found practicable, as far South as Charenton Canal. And on the left or East bank, some 15 miles, to the head of Whisky Bay, where, until this section of country contiguous to that bank, below, builds up from the deposits of the river, the terminus of the levee line on the left or East bank must rest. The extension on the left or East bank will involve as much as 1,500,000 cubic yards of earthwork, and that on the right or West bank, dependent upon final location, from 5,000,000 to 8,000,000 cubic yards. In the extension of the levee line on the left or East bank of the Atchafalaya River, to the head of Whisky Bay, no obstacle of any particular moment presents itself. It is simply a matter of opportunity to proceed and resources with which to meet estimates.

The same may, at this time, be said in regard to the extension of the levee line on the right or West bank of the Atchafalaya River. But, for a long while, considerable difference of opinion, locally, not of the wisdom of extending the line, but in regard to the recommendations of the Board of State Engineers, existed. This arose from the fact that, under the directions of the Board of State Engineers, this extension would involve the closure of Bayou Courtableau.

It was, however, known that the principal source of opposition to the recommendation of the Board of State Engineers emanated from the Union Irrigation Company, at Washington, La., under the mistaken apprehension that the closure of Bayou Courtableau would injuriously affect its water supply.

However, at a joint meeting of the Boards of Commissioners of the Atchafalaya Basin and the Red River, Atchafalaya and Bayou Boeuf Levee Districts, at Baton Rouge, on October 25th, 1911, specially called to discuss the subject, Mr. J. Franklin Scheli, resenting the Union Irrigation Company, and acting in the capacity of a delegate to the meeting, from the town of Washington, and from the Parish of St. Landry, submitted the following proposition:

"That, provided the Union Irrigation Company were permitted, at its own expense, to place a flood gate in the line of levee at the mouth of the Courtableau, or at some other more suitable point, to maintain, under control, water connection, when needed and permissable, between the Atchafalaya River and Bayou Courtableau, with sills, or waste weirs, across the openings through the South bank of the latter, at elevations that would retain a certain flood level, in the Courtableau, to insure a stated supply, but not sufficient to interfere with the drainage of the country above and into the Courtableau, all objection, in the section represented by him, to the extension of the levee line across the Courtableau, would not only be removed, but the early undertaking and forwarding of the proposition would be accepted with satisfaction."

This, the two districts, upon the recommendation of the Board of State Engineers, agreed to, requiring, however, that the location of the flood gates, and all plans, specifications, etc., for it and such sills or waste weirs, through the South bank of Bayou Courtableau, as might be decided upon, should be subject to the approval of the Board of State Engineers, and the United States Engineer in charge of the district.

On November 14th, 1911, this and other presentations of the proposition were placed before the Secretary of War of the United States, by the two districts, and, under date of December 28th, 1911, authority was received from the Secretary of War of the United States "to extend a levee along the West bank of the Atchafalaya River across Bayou Courtableau, Louisiana, in such a way as to close the mouth of said bayou, at the location and as shown on attached plans."

Therefore, as already expressed, the extension of the line of levee on the right or West bank of the Atchafalaya River is now, as with the extension on the left or East bank, also but a matter of opportunity to proceed and resources with which to meet estimates, and it is, at this time, already contemplated by the two districts interested, assisted by the State, to make provision to proceed with a part of the work after the period of high water in the Atchafalaya River this year.

Separation Of The Red And Atchafalaya Rivers From The Mississippi River.

In the bi-ennial report of the Board of State Engineers, from April 20th, 1908 to April 20th, 1910, after submitting arguments sustaining its advocacy of the proposition to separate the Red and Atchafalaya Rivers from the Mississippi River, the Board recorded itself as follows:

> "Finally, the Board of State Engineers, after weighing all these considerations, is disposed to place itself on record as being in favor of the project, as a general proposition, taken up at the proper time and in its proper order. It certainly would appear to be a logical sequence to all that has gone before in the light of river improvement, from both the standpoint of navigation and protection from overflow."

The conduct of Old River and the Atchafalaya River, during the past two years, has so strengthened the views of the Board of State Engineers, then expressed, that it feels, at this time, constrained to add the direct opinion that the proposed separation should not be delayed any longer than can possibly be avoided.

Old River appears to continue to steadily enlarge at a material rate and the increase in flood levels, at and above the lower ends of the lines of levees on the East and West banks of the Atchafalaya River, at lower stages of the river at Melville than formerly, is, with each recurring freshet in the river, very marked and alarming.

This is due to the fact that, as Old River deepens and increases in section, the influences of rises in the Mississippi River is felt in the Atchafalaya River, at lower elevations, and at earlier and for longer periods than formerly, when the reverse was true. Thus the basin, through which it flows, is, under these conditions, already practically charged with overflow much in advance of the usual period of high water in the Atchafalaya River, in the past, and at such time serious congestion results in the smaller river below not yet reached by confinement by levees, and where enlargement has, therefore, not yet occurred.

The Board of State Engineers is thus lead to fear that this enlargement of Old River must, in time, extend to the Atchafalaya River itself, and possibly to such an extent as to sooner or later

affect the Mississippi River so seriously in regimen as to cause a diversion from its present route to the sea to that occupied by the Atchafalaya River. This would undoubtedly prove a calamity to all South Louisiana.

Again, under any circumstances, a failure to exclude the waters of the Mississippi River from the lower Red River and the Atchafalaya River basins, operates, to almost a prohibitive degree, against the successful development, upon anything like comprehensive and economic lines, of that section of the State from the point of view of protection from overflow, drainage and reclamation.

However, the whole subject matter is in the hands of the Mississippi River Commission for investigation, study and report, and it is known that the Commission has, during the past two years, eleborately surveyed the situation to this end.

It is sincerely to be hoped that the benefit of the investigations of the Mississippi River Commission may be soon enjoyed by the public.

Bayou Lafourche.

During the past two years, the Joint Organization of the Atchafalaya Basin and Lafourche Levee District, charged by law with carrying out certain projects for the improvement of Bayou Lafourche, has confined its operations to such dredging as was demanded to maintain a suitable channel for navigation by such craft as now ply upon that stream, to guarding against congestion by the water hyacinth, and to the maintaining of fresh water connection with Lake Verret.

In regard to the lock near the head of Bayou Lafourche, at Donaldsonville, revised plans and specifications for its construction, on less extensive and simpler lines than at first contemplated, are, at the request and at the expense of the Joint Organization, being, by courtesy, prepared under the direction of Colonel Lansing H. Beach, Corps of Engineers, U. S. A.

In the meantime, the dam at the head of the Bayou, authorized by the Secretary of War, pending the construction of a lock, will no doubt be permitted to remain. However, it should not be overlooked that this is, under all circumstances surrounding it, a great concession on the part of the National Government, and steps to

adjust the situation to comprehensive and permanent lines should not be delayed any longer than can possibly be helped.

The project for permanently closing Bayou Lafourche at its head, at Donaldsonville, by a lock or dam continues in favor, the benefits to the entire section of the State contiguous to Bayou Lafourche being manifold and convincing beyond the most sanguine expectations of its promoters.

HIGHWAYS.

This subject, of such widespread interest to the State at large, the Board of State Engineers considered entitled to treatment in a special report, addressed to it by its Acting State Highway Engineer. This report here follows; viz:

HIGHWAY DEPARTMENT
OF THE
BOARD OF STATE ENGINEERS
ROOM 104
NEW ORLEANS COURT BUILDING.

NEW ORLEANS, LA., April 20, 1912.

To the Board of State Engineers:

The closing paragraph under the caption of "Roads" in the last biennial report of the Board of State Engineers, read as follows:

"With reference to the question of public roads, the Board of State Engineers is, as with the problem of drainage, also of the opinion that the ultimate systematic and comprehensive results at large will only be attained through State organization and direction."

Act 49 of the Session of the State Legislature in 1910 furnished foundation and authority for just such State organization and direction as was suggested in the foregoing paragraph.

Under the provisions of this act, a State Highway Department was created and the enabling act, No. 14 of the same year, provided revenues for the organization and operation of the Department. Act 49 provides that the Highway Department be made a subsidiary department of the Board of State Engineers, and the duties of the Board in this respect, as defined by this act, are "Control of State

Highways under certain conditions; to elect a State Highway Engineer; to define his powers and duties; and fix his compensation; to authorize the construction and maintenance of highways by contract or by the Highway Engineer; to provide for the working of convicts on highways under certain regulations, to authorize the acquisition, by expropriation or otherwise, of rights of way for highways, drainage canals, or ditches; to provide a revenue for carrying out the objects and purposes of this act, and to provide for the disbursement thereof; and to require the parishes, cities, towns and villages to contribute a certain proportion of the costs of constructing and maintenance of highways; defining a State Highway, and repealing all laws or parts of laws in conflict with this Act."

Act. No. 14 is in the form of a joint resolution of the House and the Senate, amending the Constitution of the State of Louisiana, and is self-executing without the necessity of an enabling act of the Legislature, and had effect from the date of its adoption. The tax it provides is considered a part of the general six mill State tax authorized to be levied by the Constitution.

The act authorized the levy and collection of one-fourth of one mill on the assessed value of all property in the State of Louisiana, for the creating of a road fund to construct and maintain public roads of the State.

Act. 49 approved June 29th, 1910, and promptly promulgated, becoming effective during the summer of 1910, but, as the road tax was not to be levied until the year 1911 and no revenues could be expected till then, it was not considered advisable to officially organize the Highway Department until the early part of 1911. Consequently, the highway work which had been inaugurated prior to the passage of Act 49, under the broad plan which His Excellency, Governor J. Y. Sanders advocated, and arranged, whereby the Federal Government, the State, and the Parishes of the State cooperated, was continued under that arrangement up to February 1st, 1911.

The following statements show the number, the location, the character, the length, and the cost of construction of the highway projects undertaken and completed under this arrangement up to February 1st, 1911:

RECAPITULATION OF ROADS CONSTRUCTED TO FEBRUARY 1ST, 1911, SHOWING LOCATION, CHARACTER, MILEAGE, COST; AVERAGE COST PER MILE IN EACH PARISH, TOTAL MILEAGE CONSTRUCTED, AND TOTAL COST.

PARISH	General Character	Mileage	COST	Average Cost Per Mile
Natchitoches	Earth	13.40	$ 8,576 55	$ 640.04
DeSoto	Sand. Clay	34.15	28,380.83	831.06
Ouachita (*)	4¼ Miles Gravelled, 13 Miles Earth	17.25	25,089.10	1,454.44
Rapides	Earth	3.57	3,273.50	916.94
E. Baton Rouge	Earth	19.19	15,965.44	831.96
Orleans	Earth	15 00	13,494.95	899.66
City of Baton Rouge	Wide Gravel	.82	5,023.08	6,125.71
Total		103.38	$99,803.45	

(*) Ouachita Parish—

Average cost 4¼ miles gravelled road $3,196.58

Average cost 13 miles earth road 884.90

	Miles	Cost	Average Cost Per Mile
Total Earth Roads Constructed	64.16	$52,814.08	$ 823.16
Total Gravelled Roads Constructed	5.07	18,608.54	3,670.32
Total Sand-Clay Roads Constructed	34.15	28,380.83	831.06
Total	103.38	$99,803.45	

Average cost per mile of all roads constructed..... $965.40

STATEMENT OF ROADS CONSTRUCTED BY CONVICT LABOR TO FEBRUARY 1st, 1911, SHOWING LOCATION, COST AND AVERAGE COST PER MILE.

Natchitoches Parish.	*Miles.*
*From the limits of the City of Natchitoches to the limits of the City of Campti	8.8
From Campti towards Black Lake	3.5
From Main Road to Hagan	0.6
From Main Road to River Front (Corley Spur)	0.5
Total Miles Completed	13.4
Total Miles Constructed	13.4
Net Cost	$8,576.55
Average Cost per Mile	$ 640.04

*A small stretch (about four miles) of the road next to the corporate limits of Natchitoches as gravelled.

De Soto Parish.	*Miles.*
From the City Limits of Mansfield to the City Limits of Grand Cane	6.25
From the City Limits of Grand Cane to Keatchie Spur	4.80
From Keatchie Spur to Gloster	2.56
From Gloster to Cypress Bayou (Parish Line)	7.78
From Main Road towards Keatchie	5.50
Roads Built in City of Grand Cane	2.00
From Main Road to Gloster (Gloster Spur)	1.19
Roads Built in City of Mansfield	.25
Greening Ferry Road	2.00
Old Pleasant Hill	1.82
Total Mileage Roads Constructed	34.15
Total net cost	$28,380.83
Total mileage constructed	34.15
Average cost per mile	$831.06

Ouachita Parish—	Miles.
Claiborne Road—West Monroe to Calhoun	14.75
Arkansas Road—From West Monroe	2.50
Total miles constructed	17.25

COST OF CONSTRUCTION.

Cost of graveling 4¼ miles of road (1¾ miles on Claiborne Road, and 2½ miles on Arkansas Road), 15 feet wide, 8 inches thick at center, 6 inches thick at sides, including all cement culverts, vitrified and concrete pipe with cement retaining walls, per mile, $3,196.58	$13,585.46
13 Miles of earth road, with heavy cuts and fills, per mile, $884.89	11,503.64
Total net cost	$25,089.10
Total net cost 17¼ miles	$25,089.10
Total net cost per mile	1,454.44

Rapides Parish—	Miles.
From the City Limits of Pineville to Encampment Grounds	3.07
From the railroad within the limits of Pineville in a southerly direction	.50
Total mileage	3.57
Total net cost	$3,273.50
Total mileage constructed	3.57
Average cost per mile	$916.94

East Baton Rouge Parish—	Miles.
From North Boulevard across Allen Street to Government street	.27
From Allen Street out Government Street, and Hope Villa Road to Hope Villa	14.03
Loop—From Judge Brunot's Place, extending around Capitol Heights to old Clay Gut Road to Laycock's Place	1.65
From City Limits of the City of Baton Rouge along Greenwell Springs Road to the Baton Rouge, Hammond & Eastern Railroad	3.24
Total mileage	19.19

Total net cost $15,965.44
Total mileage constructed 19.19
Average cost per mile $831.96

N. B.—This statement does not include roads constructed in the City Liimts of the City of Baton Rouge. See attached statement covering cost and mileage of roads constructed in the City of Baton Rouge.

Orleans Parish— Miles.

From Louisville & Nashville Railroad crossing to Michaud Station, and from Michaud Station toward Chef Menteur 15.00

Total net cost $13,494.95
Total mileage constructed 15.00
Average cost per mile $899.66

City of Baton Rouge— Miles.

From High School up North Boulevard to Allen Street .82

Total net cost $5,023.08
Total mileage constructed ..... .82
Average cost per mile $6,125.71

Surfaced with Colfax gravel 25 feet wide, 8 inches thick in center, and 6 inches thick on sides.

TABLE SHOWING THE RELATIVE CONDITIONS EXISTING IN THE SECTIONS THROUGH WHICH ROADS WERE CONSTRUCTED.

PARISH	Class of Road	Clearing and Grubbing	Excavating	Drainage	Culverts and Bridging	Cost Per Mile
Rapides	Earth	Heavy	Light	Medium	Heavy	$ 916.94
*DeSoto	Sand-Clay	Heavy	Medium	Medium	Medium	831.06
Ouachita	Earth	Very Heavy	Very Heavy	Medium	Medium	884.90
Ouachita	Gravel	Light	Medium	Heavy	Heavy	3,196.58
Natchitoches	Earth	Very Light	Light	Light	Medium	640.04
E. Baton Rouge	Earth	Light	Medium	Excessively Heavy	Heavy	831.96
City of Baton Rouge	Gravel	None	Medium	Medium	Heavy	6,125.71

(*) Considerable sand was applied to heavy clay sections, while clay was applied to many deep sandy sections.

On February 1st, 1911, the Highway Department was officially organized, and such work as was still in course of construction with State convicts, was taken over by the Highway Department. Act 49 of 1910 provided for the appointment of a Highway Engineer; but, for the sake of economy, the Board of State Engineers deferred such appointment, and, by rearranging the assignments of the members of the Board, made it possible to assign one of its members, Mr. Gervais Lombard, to act as Highway Engineer without extra compensation. Moreover, his traveling expenses are paid out of the General Engineer Fund, whereas, those of a special Highway Engineer would have had to be paid out of the scant highway fund.

The personnel of the Highway Department, as at present constituted, is as follows:

Organized February 1st, 1911, with the following officers:

F. M. KERR, Chief State Engineer and President Board of State Engineers.
GERVAIS LOMBARD, Member of the Board of State Engineers, and Acting State Highway Engineer.
C. C. SANDOZ, Secretary.
GEO. L. COOLEY, Superintendent of Construction.
C. M. KERR, Chief Draftsman and Assistant Engineer.
CHAS. CHAUCHON, Stenographer.

Engineer Assistants have been employed from time to time as the conditions required. The present force of Engineer Assistants are:

W. H. NORCKAUER.
ROGER W. RICHARDSON,
LOUIS T. GILMER,
HENRY T. RICHARDSON,
B. D. WOOD,
T. S. SHIELDS.

It was found to be necessary for these Engineer Assistants to remain in the field during the entire period of construction of the projects under their direct care. The duties of the Superintendent of Construction are to visit all road work in course of construc-

tion and see that same is being conducted economically and along approved lines. He is to attend to the details of all arrangements for moving and establishing the convict camps, and to inspect the condition of completed State Aid Roads, report their condition to the Highway Engineer, and see that all contracts or arrangements for their maintenance are enforced or forfeited.

He also attends to a number of other duties from time to time, as the exigencies of the work of the Department require, and which the Board of State Engineers, through its Acting Highway Engineer may direct.

As soon as the Highway Department had been organized, notice was sent to all of the Police Juries in the State to the effect that State Aid was available, and that applications for same would be considered in the order of their receipt. A number of applications were received, and various sums were set aside by the Highway Department, out of the Highway Fund, to meet the State's portion of the cost of the projects agreed upon. Some of the Parishes, whose applications had been favorably acted upon failed, for one reason or another, to qualify, and it became necessary for the Department to rearrange its allotments.

The Parishes and Municipalities to which Monetary State Aid have been alloted, and the amounts alloted are as follows:

Grant Parish	45,866.66	Estimated
DeSoto Parish	14,019.00	"
St. Bernard	6,318.80	"
East Carroll	10,000.00	Fixed Amt.
Iberia	17,500.00	Estimated
Franklin	6,152.50	"
Plaquemines	39,227.08	"
Total	$139,084.04	

In arriving at the apportionment of the highway fund shown above, the Board of State Engineers, gave preference to projects which were of sufficient magnitude to insure a practical demonstration of the benefits of highway improvement. In other words, a long stretch of improved road, even though unsurfaced, was considered to be more useful to the community in which it was constructed, and to be a better educational factor than a short stretch of more expensive type. In the first place, the higher class metal

surfaced roads can scarcely be afforded throughout the sparsely settled rural communities, while the improved earth roads can, and, whenever traffic justified the outlay, metal surfacing can easily be provided at any time, especially after the community has learned the true value of even improved earth roads.

The foregoing statement does not include Parishes to which State Aid in another, though just as substantial form as the monetary form of aid, has been rendered. Namely:

RAPIDES	NATCHITOCHES
DESOTO	EAST BATON ROUGE
OUACHITA	ORLEANS

Not to mention several municipalities through which work was done to connect up Parish highways.

This form of State Aid is, in fact, a continuation of the plan already mentioned as having been advocated by Governor Sanders, except that the Federal Government no longer co-operates to the extent of lending the services of an experienced Superintendent of Construction and several Junior Highway Engineers. The State of Louisiana, through its Highway Department, assumed entire control of the Engineering features and supervision of construction, while, through its Board of Control of the State Penitentiary, it furnishes convicts for all the labor necessary. No charge is made for the services of either the Highway Department or the convict forces. The Parish thus aided by the State is required, however, to furnish an outfit of mules, machinery, tools and equipment; and to pay all the expenses of guarding, transporting, feeding, working and caring for the men and outfit; also to supply all bridge, culvert and other road material utilized. Improved earth roads constructed under this form of State Aid are found to cost the Parishes employing it, practically the same per mile of road constructed, as similar work let out by contract, and where the State pays half the cost.

DeSoto Parish received both forms of State Aid at the same time, for a while. That is, they maintained a camp of State Convicts, prior to and during the entire period covered by this biennial report, and also let out a contract jointly with the State for the construction of about nineteen miles of road which is now in course of construction. (See statement Page 51.)

Only very recently a camp of State convicts has been started in

St. John the Baptist Parish, where they are now at work on the road on the East or right bank of the Mississippi River.

The last biennial report mentioned a number of projects surveyed for, under way, or completed by such convict forces, but did not give exact mileage or cost data. It is therefore necessary in the following table, to include all the work so done, even that completed prior to April 21st, 1910:

STATEMENT SHOWING MILEAGE OF GOOD ROADS CONSTRUCTED WITH CONVICT LABOR, COST OF SAME AND COST PER MILE, FROM APRIL 20, 1908, TO APRIL 20, 1912.

PARISH	General Character	Mileage	Cost	Average Cost Per Mile
*Natchitoches	Earth	37.23	$29,021.01	$ 779.51
†DeSoto	Sand-Clay	50.39	43,797.59	869.17
‡Ouachita	4¼ Miles Gravelled, 13 Miles Earth	17.25	25,089.10	1,454.44
Rapides	Earth	3.57	3,273.50	916.94
‖East Baton Rouge	Earth	22.22	23,400.53	1,053.13
Orleans	Earth	15.50	16,110.11	1,039.36
City of Baton Rouge	Wide Gravelled	.82	5,023.08	6,125.71
St. John the Baptist	Earth	.50	450.00	900.00
Total		147.48	$146,164.92	

*3 Miles sand-clay.
†5 Miles natural gravel.
‡ ‡Average cost 4¼ miles gravelled road, $3,196.58.
‡Average cost 13 miles earth road, $884.90.
‖This item includes the cost of 1.1 miles of drainage canal, costing approximately $3,092.70.

	Miles	Cost	Average Cost Per Mile
Total Earth Roads Constructed	92.02	$83,758.79	$ 910.22
Total Sand-Clay Roads Constructed	50.39	43,797.59	869.17
Total Gravelled Reads Constructed	5.07	18,608.54	3,770.32
Total	147.48	$146,164.92	

Average cost per mile of all roads constructed $991.08

The Highways undertaken with Monetary State Aid between April 21st, 1910, and April 21st, 1912, are as follows:

CONTRACTS LET BY THE HIGHWAY DEPARTMENT OF THE BOARD OF STATE ENGINEERS FROM APRIL 21, 1910, TO APRIL 20, 1912.

Date of Contract.	PARISH.	NAME OF ROAD.	Character.	Distance in Miles.	Amount.	Portion Completed April 20, 1912.	REMARKS.
May 22, 1911	Grant	Colfax-Rochelle	Earth	30.10	$56,920.00	13.00	
June 20, 1911	De Soto	Mansfield-Logansport	Earth	20.00	28,038.00	9.00	
Aug. 14, 1911	Plaquemines	Pointe-a-la-Hache Highway	Shell	33.00	119,681.25	None	Construction to begin about May 1, 1912.
Sept. 25, 1911	Grant	Pollock Branch	Earth	12.87	24,665.30	12.87	
Sept. 23, 1911	St. Bernard	Toca Settlement Highway	Shell	3.00	12,167.50	1.50	
Oct. 23, 1911	East Carroll	State Line to Madison Parish Line	Earth	38.00	24,925.00	21.00	
Nov. 6, 1911	Franklin	Winnsboro Highways	Earth	12.00	12,805.00	None	Construction to begin about May 1, 1912.
March 26, 1912	Iberia	New Iberia to Jeanerette	Petrolithic Macadam Liquid Asphalt Binder	9.50	52,413.00	None	Construction to begin about May 1, 1912.
	Total			158.55	$331,115.05	57.37	

The foregoing statements do not include the New Basin Canal and Shell Road Causeway, which was constructed and paid for in its entirety by a State institution, the Board of Commissioners New Basin Canal and Shell Road.

This causeway was, up to three years ago, a toll-road, operated by the State. It was surfaced with shells and for many years was considered one of the fastest driveways in existence. However, this road proved to be too low for uninterrupted traffic, often being submerged by storm tides in Lake Pontchartrain. For this reason Governor Sanders induced the Orleans Levee Board to elevate the road bed to serve as a part of the protection levee, and the Canal Board then remodeled and rebuilt the road, making of it one of the finest shelled causeways in the world. It is now well above storm tide, is 3½ miles long, is paved 40 feet wide, and is as smooth and level as it was possible to construct it. It cost approximately $78,000.00, and is being maintained in almost perfect condition.

A feature of the Highway Department's duties, which the Board of State Engineers had at first hoped could be more economically assumed by the communities to which State Aid had been rendered, was the maintenance of completed improved highways; but our experience has shown that the local authorities cannot, except in rare cases, be depended upon. The Highway Department has therefore been forced to budget for the future, a somewhat larger proportion of its funds for this purpose than in the past.

For the lack of simple dragging with a King split log drag, or similar device manufactured of steel, many miles of the improved earth roads constructed with State Aid have suffered severely. A system of inspection and maintenance is now being devised, whereby the Highway Department will attend directly to letting the contracts for and supervising the work of dragging and otherwise maintaining these highways.

The rapid increase in the number of automobiles and motor driven vehicles throughout the State has introduced new problems which it will be necessary for the Highway Department to meet. Besides the confusion brought about by various licensing and numbering systems, independently imposed by the several municipalities in the State, and which makes it very difficult to identify the

swiftly moving motor cars, these heavy and powerful machines exert tremendous force suddenly on comparatively small areas, ravel all classes of road, and stir the dust so seriously as to cause injury and rapid deterioration of the surface of the roads. The need of some uniform and centralized regulation has been recognized throughout the United States and many of the States have enacted State wide regulation. The subject is one which should receive serious consideration in Louisiana.

Respectfully submitted,

HIGHWAY DEPARTMENT
OF THE
BOARD OF STATE ENGINEERS.
GERVAIS LOMBARD,
Assistant State Engineer, and Acting State Highway Engineer.

C. C. SANDOZ, *Secretary.*

DRAINAGE AND RECLAMATION.

The statutes of 1910 practically supplanted all previous legislation on the subject of drainage and reclamation in Louisiana.

Act No. 197 of the General Assembly of the State, passed at the session in 1910, proposing an Amendment to Article 281 of the Constitution of Louisiana of 1898, was adopted and embodied as part of the organic law by the electors of the State at the General Election held on November 10th, 1910. Act No. 256 of the same session, provided the mode of holding special elections for special taxes and forced contributions, and for the issuance of bonds thereunder, and Act. No. 317 prescribed the manner and mode of organizing and administering the affairs of drainage districts generally.

Act 317, Section 21, recites "In determining the costs of the drainage, it shall be the duty of the Board of State Engineers, when called upon, to make all surveys and examinations necessary to determine such cost, and to run all lines and levels, lay off canals and levees, locate all pumping stations, and perform any and all other services in connection with the drianage and reclamation of the lands of any district that may be required by the Commissioners of said district. The Drainage District shall pay the expenses incurred by the Board of State Engineers in making such surveys."

Under this Act, the Board of State Engineers has been called upon for surveys and the engineering advice necessary, by the following named drainage districts:

Thornwell Drainage District No. 1, Calcasieu Parish.
Avoyelles Drainage District No. 1, Avoyelles Parish.
Eighth Ward No. 1 Drainage District, Lafayette Parish.
Avoca Drainage District of St. Mary Parish.
Bayou Terre aux Boeufs Drainage District and Sub-Drainage District "A," "C" and "D," of Plaquemines Parish.
New River Drainage District of Ascension Parish.
Bayou Sale Drainage District of St. Mary Parish.
Sixth Ward and Crowley Drianage District of Acadia Parish.
St. Charles Municipal Drainage District, and Sub-Drainage Districts Nos. 1, 2, 3, 4 and 5, of St. Charles Parish.
Franklin Drainage District of St. Mary Parish.
English Turn Drainage District of Plaquemines Parish.
Gueydan Sub-Drainage District No. 1 of Vermillion Parish.
Fourth Ward Drainage District of Lafayette Parish.
Bayou Queue de Tortue Drainage District of Acadia Parish.
Belle Chasse Drainage District of Plaquemines Parish.
Brookston Drainage District of East Baton Rouge Parish.
Drainage District No. 2 of Madison Parish.
Pontchartrain Sub-Drainage District No. 1 of St. Charles Parish.
Vinton Drainage District of Calcasieu Parish.
Keystone Drainage District of Calcasieu Parish.
Upper Terrebonne Drainage District of Terrebonne Parish.
Cameron Drainage District of Cameron Parish.
Kinder Drainage District of Calcasieu Parish.

Of these, the Board of State Enginers has already reported upon the practicability, feasibility and cost of the following, viz:

Thornwell Drainage District No. 1 of Calcasieu Parish.
Avoyelles Drainage District No. 1 of Avoyelles Parish.
Eighth Ward No. 1 Drainage District of Lafayette Parish.
Avoca Drainage District of St. Mary Parish.
Bayou Terre aux Boeuf and Sub-Drainage Districts "A," "C" and "D" of Plaquemines Parish.
New River Drainage District of Ascension Parish.
Bayou Sale Drainage District of St. Mary Parish.

Sixth Ward and Crowley Drainage District of Acadia Parish.

St. Charles Municipal Drainage District and Sub-Drainage Districts Nos. 1 and 2 of St. Charles Parish.

English Turn Drainage District of Plaquemines Parish.

Gueydan Sub-Drainage No. 1 District of Vermillion Parish.

Fourth Ward Drainage District of Lafayette Parish.

Pontchartrain Sub-Drainage District No. 1 of St. Charles Parish.

Drainage District No. 2 of Madison Parish.

Belle Chasse Drainage District of Plaquemines Parish.

The extent and diversity of the productiveness of the wet lands of Louisiana, when properly drained and reclaimed is, daily, becoming so generally and favorably recognized that the formation of New drainage districts is following at a very rapid rate, and the efforts of the Board of State Engineers to keep pace with the demands for surveys and services in connection therewith will, in conjunction with the numerous other duties required of it in other directions, be, thereby, more and more severely tested.

New Basin Canal and Shell Road.

The Board of Control of the New Basin Canal and Shell Road has, during the past two years, as during similar periods, called upon the Board of State Engineers, on a number of occasions, for engineering advice and duties.

This involved lines, levels and specifications in connection with the establishment of the boundaries of its property, dredging of channels, maintenance of highways and revetments, and checking up elevations of pipes and conduits for the flow of water, gas, electricity, etc., permitted by the Board to be, under certain conditions and stipulations, extended across the canal.

The crowning work of the Board of Control of the New Basin Canal and Shell Road, however, during the past two years, outside of the generally accepted admirable conduct of the affairs of the Board, of which a report will be, as usual, submitted by the Board itself, was the completion, under the plans and specifications of the Board of State Engineers, of the shell road on the West bank of the Canal, from Metairie Cemetery to West End, and its maintenance in such excellent condition since.

The Board of State Engineers, in its last bi-ennial report said, "There is little reason to doubt that this roadway, when completed, which will be within the course of the next thirty days or so, will rank in durability, service and elegance with most of the very best in the country at large."

This forecast has been verified in all particulars.

Stages Of The Rivers.

From the following table, showing the highest water of previous record, as well as the stages attained in 1910, 1911, and 1912, up to April 20th, 1912, or the date of this report, at stations mostly governing high water conditions affecting Louisiana, it will be seen that in 1910 and 1911, no stages were anywhere reached approximating by material margins the highest recorded flood stages of the past.

However, this year, up to the time of closing this report, new records for high water, at a number of stations in the Valley affecting Louisiana, have already been established, and it would appear probable that before the close of the high water period of the year, the highest stages of the river in the past at other stations may also be exceeded.

With reference to the high water of 1912, up to the date of this report, it is difficult to forecast the outcome. Suffice it, for the time being, to say that it would appear, in the absence of the actual gagings of the river at controlling stations, that as large a volume as, if not a larger volume of water than any in the history of the past is at this time passing down the Mississippi River.

This is largely due to the fact that conditions, this season, developed, which, in the past, were accepted as possible but not probable, namely, climatic influences permitting continued widespread and severe precipitation, and the melting of snow and ice, at about one and the same time, in the several larger tributaries to the Valley, instead of from one or at most two, as is usual to that period of the year during which the Mississippi River is called upon to carry and care for Spring floods.

Again, more basins in the Valley had been leveed than ever before, imposing upon the other levee systems upon which it has been dependent for protection unusual additional service and strain.

Thus, it is with regret that it must be recorded that a number of serious breaches have already occurred in the lines of levee in Arkansas, Mississippi and Louisiana.

Those, however, most immediately affecting Louisiana are so far limited to four, namely, the crevasse at Panther Forest, about 16 miles below Arkansas City, in Chicot County, Arkansas; at Salem, about 19 miles below Lake Providence, East Carroll Parish, Louisiana,—both on the West bank of the Mississippi River; near Atkins Bayou, about 4:5 miles below West Melville, St. Landry Parish, on the West bank of the Atchafalaya River, and at a point about 10 miles below East Melville, on the East bank of the Atchafalaya River.

Neither the exact causes of these breaks, nor the full extent of the damages that may result can at this early date be stated.

However, it may, without fear of justified contradiction, be asserted that, in spite of these four evidences of weakness in the lines of levees upon which our State is relying for protection from overflow, the system as a whole has generally proven a monument of effectiveness, and should continue to inspire the utmost confidence in the possibility of its ultimate perfection and triumph under and over all conditions.

This calls only for higher grades, here and there, more ample cross-section, most everywhere, special treatment of base in certain localities where unstable sub-strata are known to prevail, and thorough, systematic comprehensive organization at all times for preservation and maintenance:

LOCALITY.	Highest Water of Previous Record.		High Water 1910.		High Water 1911.		High Water, 1912, to April 20, 1912.	
	Gage Reading.	Year.	Gage Reading.	Below Highest Water.	Gage Reading.	Below Highest Water.	Reading.	Above or Below Highest Water.
MISSISSIPPI RIVER—								
Memphis, Tenn.	40.30	1907	33.12	7.18	36.50	3.80	44.90	+ 4.60
Arkansas City, Ark.	52.90	1903	43.13	9.77	48.00	4.90	55.40	+ 2.50
Greenville, Miss.	49.10	1903	36.95	12.15	41.60	7.50	50.50	+ 1.40
Lake Providence, La.	46.48	1903	36.90	9.58	41.50	4.98	48.25	+ 1.77
Vicksburg, Miss.	52.48	1897	40.60	11.88	45.10	7.38	51.90	— 0.58
St. Joseph, La.	48.07	1903	36.30	11.77	41.20	6.87	48.60	+ 0.53
Natchez, Miss.	50.35	1903	39.80	10.55	44.30	6.05	51.40	+ 1.05
Red River Landing, La.	50.20	1897	38.50	11.70	42.70	7.50	50.10	— 0.10
Baton Rouge, La.	40.65	1897	29.50	11.15	32.50	8.15	40.50	— 0.15
Donaldsonville, La.	32.75	1897	23.00	9.75	25.40	7.35	32.20	— 0.55
Carrollton, La.	19.42	1903	12.85	6.57	14.60	4.82	19.15	— 0.27
New Orleans, La.	20.30	1903	14.40	5.90	16.00	4.30	20.40	+ 0.10
Fort Jackson, La.	8.30	1907	6.25	2.05	7.00	1.30	8.10	— 0.20
RED RIVER—								
Fulton, Ark.	35.75	1876	22.53	13.22	24.10	11.65	30.90	— 4.85
Shreveport, La.	35.70	1892	13.86	21.84	13.50	22.20	19.30	—16.40
Alexandria, La.	41.80	1908	22.38	19.42	25.10	16.70	33.50	— 8.30
ATCHAFALAYA RIVER—								
Barbres Landing	50.95	1897	35.37	15.58	40.20	10.75	49.25	— 1.70
Melville, La.	39.70	1908	32.14	7.56	36.70	3.00	40.50	+ 0.80

+ Above highest water of previous record.

— Below highest water of previous record.

APPENDICES.

Tabular statements showing details of the levee work of the past two years, and important statements of high water records will be found in the appendices following this report.

Appendix "A". Tabular statements relative to location, length, quality and cost of levee work undertaken by the State of Louisiana, the several levee districts of the State, and the United States, in Louisiana, and a part of Arkansas, from April 20th, 1910, to April 20th, 1912.

Appendix "B". Tabular statements relative to high water records.

It is with sorrow that the Board of State Engineers is called upon to record the death, on February 13th, 1912, of one of its time-honored and most faithful and loyal employees, R. J. Smith, Rodman. He entered the service of the department as a boy in 1880, thus devoting, in an humble but most useful way, his best energies to its interests for the unusual period of thirty-two years.

In conclusion, the Board of State Engineers wishes to express its high appreciation of the efficient and valuable services rendered by its corps of employees, namely: G. W. Lawes, Secretary; A. C. Duval, Chief Draftsman; Walter P. Villere, Assistant Draftsman; F. W. Schluter, Assistant Secretary, Stenographer and Typewriter; J. R. Adams, J. F. Villavaso, F. B. Grevemberg, Jr., and E. S. Bres, Levelers.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS.
FRANK M. KERR,
Chief State Engineer.
GERVAIS LOMBARD,
WALTER H. HOFFMAN,
J. W. MONGET,
H. C. SMITH,
Assistant State Engineers.

G. W. LAWES, *Secretary.*

APPENDIX A.

TABULAR STATEMENTS RELATIVE TO LOCATION, LENGTH, QUANTITY AND COST OF LEVEE WORK, DRAINAGE, REVETMENT, ETC., UNDERTAKEN BY THE STATE OF LOUISIANA, THE SEVERAL BOARDS OF LEVEE COMMISSIONERS, AND THE UNITED STATES, IN LOUISIANA AND A PART OF ARKANSAS, FROM APRIL 20, 1910, TO APRIL 20, 1912.

NOTE: The number of cubic yards given in the following statements for work done by the levee districts is based upon the list of dimensions furnished and estimates made by the Board of State Engineers for the levees named, and the cost is obtained by applying the price per cubic yard bid for the work, without regard to discount, interest or other incidental expenses incurred by the Levee Commissioners.

Levee work undertaken by the State of Louisiana, in the several Levee Districts, under fifty-two contracts entered into from April 20, 1910, to April 20, 1912, with seven contracts of earlier date, not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
	FIFTH LOUISIANA LEVEE DISTRICT.										
1	Willow Point to Henderson	East Carroll	Aug. 24, 1910	Feb. 17, 1912	.....	9,050	45,001	$7,065.16	15.70	Mississippi Riv.	
2	Omega	Madison	Aug. 24, 1910	May 1, 1911	.....	9,100	100,911	16,377.86	16.23	Mississippi Riv.	
3	Delta to Martin	Madison	Aug. 21, 1911	.....	.....	5,714	144,270	25,521.36	17.69	Mississippi Riv.	
4	Martin	Madison	Aug. 21, 1911	.....	.....	7,006	65,043	19,506.40	29.89	Mississippi Riv.	
5	Hodges	Madison	Aug. 21, 1911	.....	.....	8,200	53,691	12,563.69	23.40	Mississippi Riv.	
6	Diamond Island	Madison	Aug. 21, 1911	.....	.....	9,320	75,000	21,000.00	28.00	Mississippi Riv.	
7	Panola	Tensas	Aug. 24, 1910	April 10, 1911	.....	13,707	89,128	12,469.00	13.99	Mississippi Riv.	
8	Ingefield	Tensas	Jan. 3, 1910	.....	6,287	.....	315,000	63,000.00	20.00	Mississippi Riv.	
9	Kempe	Tensas	Sept. 4, 1911	.....	.....	5,779	61,677	19,428.25	31½	Mississippi Riv.	
10	Sycamore	Concordia	Oct. 29, 1909	June 13, 1910	2,994	.....	53,153	8,212.14	15.45	Mississippi Riv.	
11	Upper Green	Concordia	Oct. 28, 1909	Aug. 15, 1910	7,505	.....	293,303	65,677.47	22.40	Mississippi Riv.	
12	Lower Green	Concordia	Jan. 3, 1910	July 27, 1910	4,075	.....	160,222	40,055.50	25.00	Mississippi Riv.	
13	Fairview	Concordia	Jan. 25, 1911	July 19, 1911	6,239	.....	173,448	29,486.16	17.00	Mississippi Riv.	
	Totals				27,100	67,876	1,629,847	$340,362.99	.....		
	Less work done previous to Apr. 20, '10, and not comp'd Apr. 20, '12.				8,481	14,153	752,599	120,523.92	.....		
	Work done from April 20, 1910, to April 20, 1912				18,619 or 3.52 miles.	53,723 or 10.17 miles.	877,248	$219,839.07	.....	.....	Aver. price per cu. yd., 25.06 cts.

ATCHAFALAYA BASIN LEVEE DISTRICT.

14	Smithland	Pointe Coupee	Aug.	17, 1910		4,208		142,263	$25,607.34	18.00	Mississippi Riv.	
	Red River Landing Section					1,985		66,875	12,037.50	18.00	Mississippi Riv.	
	Torras Section						8,790	45,000	8,100.00	18.00	Mississippi Riv.	
15	Philadelphia Point	Ascension	May	8, 1911	Oct. 4, 1911	3,178		89,326	13,398.90	15.00	Mississippi Riv.	
16	Hudson	Pointe Coupee	Feb.	12, 1912		3,843		135,000	29,700.00	22.00	Atchafalaya R.	
	Totals					13,214	8,790	478,464	$88,843.74			
	Less work not completed previous to April 20, 1912					3,520	3,084	139,053	30,042.74			
	Work done from April 20, 1910, to April 20, 1912					9,694 or 1.84 miles.	5,706 or 1.08 miles.	339,411	$58,801.00			Aver. price per cu. yd., 17.32 cts.

PONTCHARTRAIN LEVEE DISTRICT.

17	Baton Rouge to Arlington	E. Baton Rouge	Sept.	15, 1911	Mar. 22, 1912		10,810	124,004	$19,468.63	15.70	Mississippi Riv.	
18	Billings	Iberville	Sept.	15, 1910	Jan. 11, 1911		3,365	34,748	5,639.60	16.23	Mississippi Riv.	
19	Ophelia	Iberville	Sept.	15, 1910	Mar. 2, 1911		4,830	42,745	5,766.30	13.49	Mississippi Riv.	
20	Gypsy	St. Charles	Sept.	30, 1909	June 24, 1910	1,890		50,342	8,004.38	15.90	Mississippi Riv.	
21	Deckbar	Jefferson	Sept.	15, 1910	Nov. 14, 1910	1,060		35,395	8,133.77	22.98	Mississippi Riv.	
	Work done from April 20, 1910, to April 20, 1912					2,950 or 0.56 miles.	19,005 or 3.60 miles.	287,234	$47,012.68			Aver. price per cu. yd., 16.37 cts.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
	LAFOURCHE LEVEE DISTRICT.										
22	Sims	Ascension	Oct. 28, 1909	Nov. 11, 1910	1,455	.....	7,258	$1,807.22	24.90	Mississippi Riv.	
23	Point Houmas	Ascension	Sept. 15, 1910	May 2, 1911	2,714	4,315	134,608	20,702.71	15.38	Mississippi Riv.	
24	Schexinaydre	St. Charles	Oct. 20, 1910	Dec. 15, 1910	725	.....	15,708	3,036.88	19⅓	Mississippi Riv.	
25	Parish Line to Belle Chasse	Plaquemines	Aug. 21, 1911		4,565	21,770	200,000	42,400.00	20.70	Mississippi Riv.	
	Totals				9,459	26,085	357,574	$67,946.81	.....		
	Less work not completed April 20, 1912				1,250	13,095	93,216	19,295.71	.....		
	Work done from April 20 1910, to April 20, 1912				8,209 or 1.56 miles.	12,990 or 2.46 miles.	264,358	$48,651.10	.....		Aver. price per cu. yd., 18.40 cts.
	LAKE BORGNE BASIN LEVEE DISTRICT.										
26	Scarsdale	Plaquemines	Sept. 15, 1910	Mar. 13, 1911	1,285	.....	25,719	$5,514.20	21.90	Mississippi Riv.	See Dist. Contract.
	Martin Section	Plaquemines			2,279	.....	31,189	6,948.65	21.90	Mississippi Riv.	See Dist. Contract.
27	Bertrandville	Plaquemines	Sept. 15, 1910	Jan. 17, 1911	823	.....	11,273	1,679.68	14.90	Mississippi Riv.	
28	Linwood	Plaquemines	Oct. 10, 1911		2,893	.....	59,585	11,142.39	18.70	Mississippi Riv.	
29	Monsecour	Plaquemines	Sept. 19, 1910	Dec. 1, 1910	931	.....	18,262	3,287.16	18.00	Mississippi Riv.	
30	E. Duplessis	Plaquemines	Sept. 20, 1909	Oct. 6, 1910	1,765	.....	18,273	2,722.68	14.90	Mississippi Riv.	
31	Arnold Cosse	Plaquemines	Nov. 27, 1909	Oct. 28, 1910	1,605	.....	20,972	3,670.10	17.50	Mississippi Riv.	
	Totals				11,581	.....	185,273	$34,984.86	.....		
	Less work done previous to Apr. 20, '10, and not comp'd Apr. 20, '12				3,640	.....	55,134	9,656.97	.....		
	Work done from April 20, 1910, to April 20, 1912				7,941 miles.	.....	130,139	$25,327.89	.....		Aver. price per cu. yd., 19.46 cts.

BURAS LEVEE DISTRICT.

32	Orange Farm	Plaquemines...	Oct.	7, 1910	Dec.	24, 1910	1,865	.....	17,086	$3,456.49	20.23	Mississippi Riv.	
33	Doullut Canal	Plaquemines...	Oct.	10, 1911	Jan.	17, 1912	.....	1,850	2,120	2,898.06	19¼	Mississippi Riv.	Inc. $2,491.06 for rev.
34	Stockfleth	Plaquemines...	Sept.	11, 1911	Mar.	21, 1912	650	548	5,142	3,061.70	24.98	Mississippi Riv.	Inc. $1,640.20 for rev.
35	Clinton to Moizant	Plaquemines...	Sept.	14, 1911	Jan.	2, 1913	2,710	.....	3,578	4,901.34	24¼	Mississippi Riv.	Inc. $4,033.68 for rev.
36	Moizant	Plaquemines...	Sept.	11, 1911	Jan.	17, 1912	1,115	.....	7,933	3,809.74	27.73	Mississippi Riv.	Inc. $1,609.92 for rev.
37	Cognovitch	Plaquemines...	Sept.	11, 1911	Nov.	17, 1912	350	.....	2,694	1,005.36	19.00	Mississippi Riv.	Inc. $493.50 for rev.
38	Pelas to Buras Church	Plaquemines...	Oct.	7, 1910	Feb.	2, 1911	1,608	.....	14,433	5,824.33	25.48	Mississippi Riv.	Inc. $2,146.80 for rev.
	Work done from April 20, 1910, to April 20, 1912						8,298 or 1.57 miles.	2,398 or 0.46 miles.	52,986	$24,957.02	.....	.....	{ Aver. price per cu. yd., 23.67 cts.

GRAND PRAIRIE LEVEE DISTRICT.

39	Fox	Plaquemines...	Oct.	4, 1909	Dec.	23, 1910	2,090	840	30,700	$4,294.48	13.99	Mississippi Riv.	
40	Church	Plaquemines...	Sept.	15, 1910	Dec.	29, 1910	715	1,270	16,373	2,495.24	15.24	Mississippi Riv.	
41	Church to Pinaud	Plaquemines...	Aug.	21, 1911	Feb.	1, 1912	903	5,685	32,348	11,057.22	17.85	Mississippi Riv.	Inc. $5,283.10 for r
42	Church to Pinaud Revetment	Plaquemines...	Dec.	14, 1911	Feb.	12, 1912	.....	.....	.....	981.54	.....	Mississippi Riv.	Revetment.
43	Waltzer	Plaquemines...	Aug.	21, 1911	Feb.	8, 1912	2,305	.....	22,696	3,154.74	13.90	Mississippi Riv.	
44	Nestor to Burton	Plaquemines...	Sept.	15, 1910	Dec.	1, 1910	145	2,572	7,742	5,092.40	18.75	Mississippi Riv.	Inc. $3,640.78 for r
45	Point Pleasant Revetment	Plaquemines...	Aug.	21, 1911	Nov.	28, 1911	.....	.....	.....	6,349.26	.....	Mississippi Riv.	Revetment.
	Totals						6,158	10,367	109,859	$33,424.83	.....		
	Less work done previous to April 20, 1910						2,200	.....	23,023	3,220.92	.....		
	Work done from April 20, 1910, to April 20, 1912						3,958 or 0.75 miles.	10,367 or 1.96 miles.	86,836	$30,203.91	.....	.....	{ Aver. price per cu. yd., 15.63 cts.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
	PLAQUEMINES PARISH EAST BANK LEVEE DISTRICT.										
46	Restoration of Gulf Coast	Plaquemines	April 29, 1910		.....	117,700	200,000	$40,000.00	20.00	Gulf Coast.	
46A	Cuselich Side	Plaquemines	March 30, 1911		1,640	.....	6,253	1,344.39	21½	Gulf Coast.	
	Totals				1,640	117,700	206,253	$41,344.39	.....		
	Less work not completed April 20, 1912				1,325	.....	5,050	1,085.75	.....		
	Work done from April 20, 1910, to April 20, 1912				315 or 0.06 miles.	117,700 or 22.30 miles.	201,203	$40,258.64	.....	.....	Aver. price per cu. yd., 20 cts.
	BOSSIER LEVEE DISTRICT										
47	Jeter	Bossier	June 15, 1911	Sept. 22, 1911	3,760	.....	49,364	$6,165.56	12.49	Red River.	
	Work done from April 20, 1910, to April 20, 1912				3,760 or 0.71 miles.	.....	49,364	$6,165.56	.....		
	BOSSIER SUB-LEVEE DISTRICT.										
48	Carolina	Bossier	Sept. 4, 1911		5,803	2,680	98,957	$12,765.45	12.90	Red River.	
	Totals				5,803	2,680	98,957	$12,765.45	.....		
	Less work not completed April 20, 1912				3,820	.....	26,848	3,463.39	.....		
	Work done from April 20, 1910, to April 20, 1912				1,983 or 0.37 miles.	2,680 or 0.51 miles.	72,109	$9,302.06	.....		

RED RIVER SUB-LEVEE DISTRICT.

49	South Bank of Loggy Bayou	Red River	June	15, 1911	Jan.	18, 1912	4,630	.....	35,581	$8,005.72	22.50	Loggy Bayou.
	Work done from April 20, 1910, to April 20, 1912						4,630 or 0.97 miles.	.....	35,581	$8,005.72	.....	

RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT.

50	Alexandria Westward	Rapides	Feb.	8, 1911	Aug.	26, 1911	35,959	.....	135,886	$19,476.99	14⅓	Bayou Rapides
51	Hatch	Rapides	Feb.	10, 1911	May	1, 1911	1,967	.....	12,658	1,737.94	13.73	Red River.
52	Melville to Latanier (480—610+58=600)	St. Landry	May	16, 1910	Feb.	13, 1911	.....	13,058	46,689	14,006.70	30.00	Atchafalaya R.
53	Latanier South (690-805)	St. Landry	Oct.	3, 1910			11,500	.....	264,117	58,105.74	22.00	Atchafalaya R.
	Totals						49,426	13,058	459,350	$93,327.37	.....	
	Less work not completed April 20, 1912						2,460	.....	56,500	12,430.00	.....	
	Work done from April 20, 1910, to April 20, 1912						46,966 or 8.99 miles.	13,058 or 2.47 miles.	402,850	$80,897.37	.....	.....

{Aver. price per cu. yd., 20.08 cts.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
	NATCHITOCHES SUB-LEVEE DISTRICT.										
54	Grand Bend	Rapides	Oct. 7, 1910	Dec. 26, 1910	2,952	.....	12,521	$1,502.52	12.00	Red River.	
55	Cut-Off Bayou	Rapides	Mar. 28, 1912		3,328	.....	62,000	9,418.50	14.95	Red River.	
56	Wilson	Rapides	Mar. 28, 1912		1,800	.....	48,000	8,030.40	16.73	Red River.	
	Totals				8,080	.....	122,521	$18,951.42	.....		
	Less work not completed April 20, 1912				5,128	.....	111,000	17,448.90	.....		
	Work done from April 20, 1910, to April 20, 1912				2,952 or 0.56 miles.	.....	12,521	$1,502.52	.....	.....	Aver. price per cu. yd., 12 cts.
	SALINE LEVEE AND DRAINAGE DISTRICT.										
57	Cassandria to Experiment Plantation	Avoyelles	Oct. 7, 1910	Mar. 28, 1911	.....	9,239	41,069	$5,749.66	14.00	Red River.	
58	Experiment Plantation South	Avoyelles	Sept. 25, 1911		.....	9,600	65,172	9,775.80	15.00	Red River.	
	Totals				.....	18,839	106,241	$15,525.46	.....		
	Less work not completed April 20, 1912				.....	382	25,956	3,893.40	.....		
	Work done from April 20, 1910, to April 20, 1912				.....	18,457 or 3.50 miles.	80,285	$11,632.06	.....	.....	Aver. price per cu. yd., 14.49 cts.

RECAPITULATION OF WORK DONE FROM APRIL 20, 1910, TO APRIL 20, 1912, AS SHOWN IN THE FOREGOING.

DISTRICT.	Miles of		Cubic Yards.	Cost.
	New Levee.	Enlargement.		
Fifth Louisiana	3.52	10.17	877,248	$219,839.07
Atchafalaya Basin	1.84	1.08	339,411	58,801.00
Pontchartrain	0.56	3.60	287,234	47,012.68
Lafourche	1.56	2.46	264,358	48,651.10
Lake Borgne Basin	1.51	....	130,139	25,307.89
Buras	1.57	0.46	52,986	24,957.02
Grand Prairie	0.75	1.96	86,836	30,203.91
Plaquemines Parish East Bank	0.06	22.30	201,203	40,258.64
Bossier	0.71	....	49,364	6,165.56
Bossier Sub	0.37	0.51	72,109	9,302.06
Red River Parish Sub	0.87	....	35,581	8,005.72
Red River, Atchafalaya and Bayou Boeuf	8.99	2.47	402,850	80,897.37
Natchitoches Sub	0.56	....	12,521	1,502.52
Saline Levee and Drainage	3.50	....	80,285	11,632.06
Totals	26.37	45.01	2,892,125	$612,536.60

Levee work undertaken by the Board of Commissioners of the Tensas Basin Levee District, under four contracts entered into from April 20, 1910, to April 20, 1912, with five contracts of earlier date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Upper Lucca	Desha Co., Ark.	Sept. 4, 1911	Feb. 17, 1912	.....	7,534	48,936	$11,499.96	23½	Mississippi Riv.	
2	Lucca	Desha Co., Ark.	Mar. 30, 1911	Feb. 17, 1912	7,018	.....	347,493	72,348.04	20.82	Mississippi Riv.	
3	Lower Lucca	Desha Co., Ark.	Sept. 4, 1911	.....	.....	3,831	49,074	10,796.28	22.00	Mississippi Riv.	
4	Chicot Front 650–699 Drain Ditch	Desha Co., Ark.	Sept. 19, 1906	June 27, 1910	4,500	.....	364,124	87,389.76	24.00	Mississippi Riv.	
			.....	.....	.....	.....	30,525	5,494.50	18.00	Mississippi Riv.	
5	Chicot Front Enlargement	Desha Co., Ark.	Sept. 27, 1910	Jan. 24, 1911	.....	930	11,870	4,688.65	39½	Mississippi Riv.	
6	Fulton Lake Enlargement	Desha Co., Ark.	Feb. 10, 1909	Mar. 1, 1911	.....	22,070	293,402	78,925.14	26.90	Mississippi Riv.	
7	Boeuf River Cut-Off No. 1	Morehouse and Richland	Sept. 15, 1909	Oct. 11, 1910	3,70	.....	7,170	1,577.40	22.00	Boeuf River.	
8	Boeuf River Cut-Off No. 2	Morehouse	Sept. 15, 1909	Oct. 11, 1910	251	.....	3,930	982.50	25.00	Boeuf River.	
9	Boeuf River Cut-Off No. 3	Morehouse	Sept. 15, 1909	Oct. 11, 1910	133	.....	1,445	317.90	22.00	Boeuf River.	
	Totals				12,272	34,365	1,157,969	$274,020.13	.....		
	Less work done previous to Apr. 20, '10, and not comp'd Apr. 20, '12.				3,900	3,831	386,874	$90,056.28	.....		
	Work done from April 20, 1910, to April 20, 1912				8,372 or 1.58 miles.	30,534 or 5.78 miles.	771,095	$183,963.85	.....	.....	Aver. price per cu. yd., 23.86 cts.

Levee work undertaken by the Board of Commissioners of the Tensas Basin Levee District, under four contracts entered into from April 20, 1910, to April 20, 1912, with five contracts of earlier date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Upper Lucca	Desha Co., Ark.	Sept. 4, 1911	Feb. 17, 1912	.....	7,534	48,936	$11,499.96	23½	Mississippi Riv.	
2	Lucca	Desha Co., Ark.	Mar. 30, 1911	Feb. 17, 1912	7,018	.....	347,493	72,348.04	20.82	Mississippi Riv.	
3	Lower Lucca	Desha Co., Ark.	Sept. 4, 1911	.....	.....	3,831	49,074	10,796.28	22.00	Mississippi Riv.	
4	Chicot Front 650–699 Drain Ditch	D'ha Co., Ark.	Sept. 19, 1906	June 27, 1910	4,500	.....	364,124	87,389.76	24.00	Mississippi Riv.	
5	Chicot Front Enlargement	Desha Co., Ark.	Sept. 27, 1910	Jan. 24, 1911	.....	930	11,870	4,688.65	39½	Mississippi Riv.	
6	Fulton Lake Enlargement	Desha Co., Ark.	Feb. 10, 1909	Mar. 1, 1911	.....	22,070	293,402	78,925.14	26.90	Mississippi Riv.	
7	Boeuf River Cut-Off No. 1	Morehouse and Richland	Sept. 15, 1909	Oct. 11, 1910	3,70	.....	7,170	1,577.40	22.00	Boeuf River.	
8	Boeuf River Cut-Off No. 2	Morehouse	Sept. 15, 1909	Oct. 11, 1910	251	.....	3,930	982.50	25.00	Boeuf River.	
9	Boeuf River Cut-Off No. 3	Morehouse	Sept. 15, 1909	Oct. 11, 1910	133	.....	1,445	317.90	22.00	Boeuf River.	
	Totals				12,272	34,365	1,157,969	$274,020.13	.....		
	Less work done previous to Apr. 20, '10, and not comp'd Apr. 20, '12.				3,900	3,831	386,874	$90,056.28	.....		
	Work done from April 20, 1910, to April 20, 1912				8,372 or 1.58 miles.	30,534 or 5.78 miles.	771,095	$183,963.85	.....	.....	Aver. price per cu. yd., 23.86 cts.

Levee work undertaken by the Board of Commissioners of the Pontchartrain Levee District, under three contracts entered into from April 20, 1910, to April 20, 1912, with one contract of earlier date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	South Boulevard to Protection Levee	E. Baton R'ge.	Feb. 29, 1912	.....	.....	2,650	25,000	$11,250.00	45.00	Mississippi Riv.	
2	Conrad	E. Baton R'ge.	.....	July 31, 1911	.....	1,610	7,877	945.24	12.00	Mississippi Riv.	
3	Billings-Point Store Section	Iberville	Sept. 15, 1910	Feb. 4, 1911	363	.....	6,672	1,082.86	16.23	Mississippi Riv.	See State Contract.
4	Landry	Ascension	Sept. 30, 1909	Aug 24, 1910	2,085	1,080	95,845	14,788.88	15.43	Mississippi Riv.	
5	Deckbar Wooden Revetment	Jefferson	Dec. 1910	Feb. 4, 1911	.....	.....	.....	1,999.20	.....	Mississippi Riv.	1,176 ft. of rev't.
	Totals				2,448	5,340	135,394	$30,066.18	.....		
	Less work done previous to April 20, 1910				800	2,650	42,300	13,919.39	.....		
	Work done from April 20, 1910, to April 20, 1912				1,648 or 0.31 miles.	2,690 or 0.51 miles.	93,094	$16,146.79	.....	.....	Aver. price per cu. yd., 15.20 cts.

Levee work undertaken by the Board of Commissioners of the Atchafalaya Basin Levee District, under eight contracts entered into from April 20, 1910, to April 20, 1912, with two contracts of earlier date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Upper Morganza	Pointe Coupee.	Jan. 29, 1910	Dec. 27, 1910	5,274	.....	259,416	$51,883.20	20.00	Mississippi Riv.	
2	Upper Allendale	W. Baton R'ge.	Aug. 25, 1910	July 11, 1911	2,651	.....	148,700	26,766.00	18.00	Mississippi Riv.	
3	Belair	W. Baton R'ge.	July 26, 1911	Oct. 18, 1911	1,360	.....	36,436	4,736.68	13.00	Mississippi Riv.	
4	Levert Upper	Ascension.	July 26, 1911		1,427	.....	47,000	6,768.00	14.40	Mississippi Riv.	
	Lower				6,251	.....	187,834	27,048.09	14.40	Mississippi Riv.	
5	Ascension-New Hope	Ascension.	Apr. 26, 1911		.....	8,561	77,579	10,434.38	13.45	Mississippi Riv.	
6	New Hope to Souvenir	Ascension.	Aug. 24, 1910	April 19, 1911	3,104	3,414	120,051	14,886.32	12.40	Mississippi Riv.	
7	Smoke Bend	Ascension.	.....	April 23, 1910	.....	1,040	9,345	1,848.60	scale	Mississippi Riv.	
8	Haygood	Pointe Coupee.	Feb. 12, 1912	.....	5,033	.....	104,800	18,864.00	18.00	Atchafalaya R.	
9	Holloway to Sherman Bayou	Pointe Coupee.	Jan. 18, 1911	.....	.....	38,094	228,169	34,202.53	14.99	Atchafalaya R.	
10	Alabama Bayou-Island	Pointe Coupee.	Sept. 24, 1909	Mar. 4, 1912	14,709	.....	338,284	150,399.34	38½	Atchafalaya R.	Inc. $20,160 for Timber Dam.
	Totals				39,809	51,109	1,557,614	$347,837.14	.....		
	Less work done previous to Apr. 20, '10, and not comp'd Apr. 20, '12.				7,677	18,511	343,182	53,780.06	.....		
	Work done from April 20, 1910, to April 20, 1912				32,132 or 6.09 miles.	32,598 or 6.17 miles.	1,214,432	$294,057.08	.....	.....	Aver. price per cu. yd., 22.54 cts.

Levee work undertaken by the Board of Commissioners of the Pontchartrain Levee District, under three contracts entered into from April 20, 1910, to April 20, 1912, with one contract of earlier date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	South Boulevard to Protection Levee	E. Baton R'ge.	Feb. 29, 1912		.....	2,650	25,000	$11,250.00	45.00	Mississippi Riv.	
2	Conrad	E. Baton R'ge.		July 31, 1911	.....	1,610	7,877	945.24	12.00	Mississippi Riv.	
3	Billings-Point Store Section	Iberville	Sept. 15, 1910	Feb. 4, 1911	363	.....	6,672	1,082.86	16.23	Mississippi Riv.	See State Contract.
4	Landry	Ascension	Sept. 30, 1909	Aug 24, 1910	2,085	1,080	95,845	14,788.88	15.43	Mississippi Riv.	
5	Deckbar Wooden Revetment	Jefferson	Dec. 1910	Feb. 4, 1911	.....	.....	.....	1,999.20	.....	Mississippi Riv.	1,176 ft. of rev't.
	Totals				2,448	5,340	135,394	$30,066.18	.....		
	Less work done previous to April 20, 1910				800	2,650	42,300	13,919.39	.....		
	Work done from April 20, 1910, to April 20, 1912				1,648 or 0.31 miles.	2,690 or 0.51 miles.	93,094	$16,146.79	.....	.....	Aver. price per cu. yd., 15.20 cts.

APPENDIX A. STATEMENT. No. 6. LAFOURCHE LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Lafourche Levee District, under four contracts entered into from April 20, 1910, to April 20, 1912.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Dugas-Landry	Ascension	Oct. 13, 1910	Dec. 28, 1910	.....	1,375	2,927	$526.86	18.00	Mississippi Riv.	
2	Flagville	St. Charles	Oct. 18, 1909	Sept. 20, 1910	585	.....	9,141	1,965.31	21½	Mississippi Riv.	
3	Stevenson to We Go.	St. John	Oct. 13, 1910	Dec. 8, 1910	.....	3,300	8,285	1,387.74	16.75	Mississippi Riv.	
4	Company Canal	Jefferson	Oct. 13, 1910	Nov. 17, 1910	471	.....	8,988	1,196.40	30.00	Mississippi Riv.	
	Work done from April 20, 1910, to April 20, 1912				1,056 or 0.20 miles.	5,175 or 0.98 miles.	24,341	$5,076.31	.....	.....	Aver. price per cu. yd., 20.85 cts.

APPENDIX A. STATEMENT NO. 7. LAKE BORGNE BASIN LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Lake Borgne Basin Levee District, under three contracts entered into from April 20, 1910, to April 20, 1912.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Scarsdale-Martin Sec.	Plaquemines...	See State Contract.		1,212	.....	14,285	$3,128.42	21.90	Mississippi Riv.	
2	Fairview	Plaquemines...	Oct. 10, 1911	Feb. 13, 1912	1,618	.....	26,679	4,666.16	17.49	Mississippi Riv.	
3	Vic Adema to Prosper Gagnet	Plaquemines...	Dec. 1, 1910	Feb. 9, 1911	.....	2,590	9,861	2,045.17	20.74	Mississippi Riv.	
4	Pointe a la Hache Capping	Plaquemines...	.....	Mar. 2, 1911	.....	6,005	3,290	690.90	21.00	Mississippi Riv.	
	Work done from April 20, 1910, to April 20, 1912.....				2.830 or 0.54 miles.	8,595 or 1.63 miles.	54,115	$10,530.65	.....		Aver. price per cu. yd., 19.46 cts.

APPENDIX A. STATEMENT NO. 8. PLAQUEMINES PARISH EAST BANK LEVEE DISTRICT

Levee work undertaken by the Board of Commissioners of the Plaquemines Parish East Bank Levee District, under two contracts entered into previous to and not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Gulf Coast Sec. 1....	Plaquemines...	Jan. 5, 1906	May 18, 1911	.....	72,554	221,038	$30,843.19	13.95	Gulf Coast.	Inc. $1,810.00 for clearing.
2	Gulf Coast Sec. 2....	Plaquemines...	Jan. 5, 1906	May 18, 1911	97,931	.....	666,536	$1,434.52	11.88	Gulf Coast.	Inc. $2,440.00 for clearing.
	Totals.....				97,931	72,554	887,574	$111,767.71	.....		
	Less work done previous to April 20, 1910.....				70,000	72,554	706,638	$86,701.76	.....		
	Work done from April 20, 1910, to April 20, 1912.....				27,931 or 5.29 miles.		190,936	$25,065.93	.....		Aver. price per cu. yd., 11.88 cts.

APPENDIX A. STATEMENT NQ 12. RED RIVER, ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

Drainage work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Bœuf Levee District, under two contracts entered into previous to April 20, 1910, and not completed at this date.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Swaze Lake to Bayou Courtableau	St. Landry	Dec. 3, 1906	Nov. 26, 1910	103,600	22.26	450,973	$136,212.97	17.98		Inc. $51,198.00 for clearing.
2	Bayou Big Jack Sec.	St. Landry	Mar. 24, 1910	Nov. 26, 1910	7,245	1.37	34,453	5,218.18	6.00		Inc. $3,151.00 for clearing. O., G. and N. E. R. R. paid $2,067 add.
	Totals				110,845	23.63	485,426	$141,431.15	.....		
	Less work done previous to April 20, 1910				102,845	21.00	447,587	131,271.31	.....		
	Work done from April 20, 1910, to April 20, 1912				8,000 or 1.51 miles.	2.63	37,839	$10,159.84	.....	.....	Aver. price per cu. yd., 10.86 cts.

APPENDIX A. STATEMENT NO. 10. RED RIVER, ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Boeuf Levee District, under three contracts entered into from April 20, 1910, to April 20, 1912.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Elba	St. Landry	Sept. 20, 1911		963	.....	13,361	$2,391.62	17.90	Atchafalaya R.	
2	Latanier South (600—690)	St. Landry	May 16, 1910	Feb. 13, 1911	9,000	.....	178,544	$9,279.68	22.00	Atchafalaya R.	
3	Latanier South (805—855+)	St. Landry	Sept. 8, 1911		5,000	.....	130,250	28,655.00	22.00	Atchafalaya R.	
	Totals				14,963	.....	322,155	$70,326.30	.....		
	Less work not completed April 20, 1912				4,545	.....	113,811	24,728.42	.....		
	Work done from April 20, 1910, to April 20, 1912				10,418 or 1.97 miles.	.....	208,344	$45,597.88	.....	.....	Aver. price per cu. yd., 22.10 cts.

APPENDIX A. STATEMENT NO. 11 RED RIVER AND BAYOU DES GLAIZES LEVEE AND DRAINAGE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Red River and Bayou Des Glaizes Levee and Drainage District under one contract entered into previous to April 20, 1910, and not completed by that date.

1	Davids Ferry South No. 2	Avoyelles	Feb. 7, 1910	Feb. 18, 1911	21,100	.....	336,208	$84,052.00	25.00	Red River.	
	Work done from April 20, 1910, to April 20, 1912				21,100 or 4.00 miles.	.....	336,208	$84,052.00	.....		

APPENDIX A. STATEMENT NO 12. RED RIVER, ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

Drainage work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Bœuf Levee District, under two contracts entered into previous to April 20, 1910, and not completed at this date.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Swaze Lake to Bayou Courtableau	St. Landry	Dec. 3, 1906	Nov. 26, 1910	103,600	22.26	450,973	$136,212.97	17.98		Inc. $51,198.00 for clearing.
2	Bayou Big Jack Sec.	St. Landry	Mar. 24, 1910	Nov. 26, 1910	7,245	1.37	34,453	5,218.18	6.00		Inc. $3,151.00 for clearing. O., G. and N. E. R. R. paid $2,067 add.
	Totals				110,845	23.63	485,426	$141,431.15	.....		
	Less work done previous to April 20, 1910				102,845	21.00	447,587	131,271.31	.....		
	Work done from April 20, 1910, to April 20, 1912				8,000 or 1.51 miles.	2.63	37,839	$10,159.84	.....	.....	Aver. price per cu. yd., 10.86 cts.

APPENDIX A. STATEMENT NO. 13. JOINT ORGANIZATION ATCHAFALAYA BASIN AND LAFOURCHE LEVEE DISTRICTS.

Work for improvement of Bayou Lafourche undertaken by the Board of Commissioners of the Atchafalaya Basin and the Lafourche Levee Districts, under two contracts entered into from April 20, 1910, to April 20, 1912, and one of earlier date not completed April 20, 1910.

Number	Name of Contract.	Parish.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
1	Cancienne Canal	Assumption	Sept. 30, 1907	May 9, 1910	7,365	.....	206,507	$30,976.05	15.00		
2	Cancienne Canal Extension	Assumption	May 27, 1910	Feb. 1, 1911	9,135	.....	103,717	15,577.55	15.00		
3	Cancienne Canal Clearing and Dredging	Assumption	Jan. 30, 1911	Mar. 1, 1911	.....	.....	.....	1,000.00	.....		Paid by force acct
	Totals				16,500	.....	310,224	$47,533.60	.....		
	Less work done previous to April 20, 1910				5,900	.....	164,500	24,675.00	.....		
	Work done from April 20, 1910, to April 20, 1912				8,000 or 2.01 miles.	2.63	37,839	$10,159.84	.....	.....	Aver. price per cu. yd., 15.00 cts.

The Board of State Engineers is indebted to the Orleans Levee Board for the following statement of work undertaken by the Board of Levee Commissioners, under eighteen contracts, entered into from April 20, 1910, to April 20, 1912.

Number	Name of Contract.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement of Levee.	Cubic Yards.	Price. Cents per Cubic Yard.	Cost of Earthwork.	REVETMENT. Linear Feet.	REVETMENT. Feet, B. M.	REVETMENT. Price per M. Feet, B. M.	REVETMENT. Cost.	Allowed on Force Acct. Claims, etc.	Total Cost.
1	Press to Louisa St.	Apr. 1, 1910	Apr. 30, 1910	.....	1,440	5,108.6	105.0	$5,364.07	.....	.....	.....	.....	.....	$5,364.07
2	Furnishing earth for levee construction bet. h'd of Carondelet Canal and Hagan Av	Mar. 19, 1910	May 11, 1910	.....	7,000	1,102.3	45.0	496.03	.....	.....	.....	.....	.....	496.03
3	Repaving ramp at Jackson Avenue..	Apr. 30, 1910	May 31, 1910	1,014.2 sq. yds. paving at 45c per sq. yd., and 296 linear ft. curbing at 8c per ft..										497.07
4	Furnishing earth west bank Bayou St. John, Magnolia Bridge to Esplanade Bridge...	Aug. 3, 1910	Oct. 3, 1910	.....	1,419	522.1	60.0	313.23	.....	.....	.....	.....	.....	313.23
5	Walnut to Joseph Street, Levee and Revetment	Sept. 28, 1910	Apr. 19, 1911	.....	6,652	120,163.3	29.5	35,448.16	2,782	117,489	$51.00	$5,991.94	.....	41,440.10
6	East bank, New Basin Canal, Magnolia St. to Carrollton Av.....	July 18, 1910	Jan. 17, 1912	.....	9,800	9,238.7	19⅞	1,836.19	.....	.....	.....	.....	.....	1,836.19
7	West bank, New Basin Canal, Magnolia St. to Carrollton Av.....	Sept. 9, 1910	Mar. 22, 1912	.....	10,000	13,044.4	83.0	10,826.85	.....	.....	.....	.....	.....	10,826.85
8	Clouet St. Enlargement	Dec. 3, 1910	Jan. 6, 1911	.....	183	869.7	93.0	808.81	.....	.....	.....	.....	.....	808.81
9	East bank, New Basin Canal, Carrollton Av. to Metairie Bridge....	Feb. 8, 1911	.....	.....	3,400	1,810.8	17.0	222.83	.....	.....	.....	.....	.....	222.83

10	Filling against Bulkhead, Wm. A. Kernaghan Whf.	Mar.	15, 1911	July	5, 1911	.....	3,171	38,794.8	23.7	9,194.37	.....	.....	.....	.....	.....	9,194.37
11	Demolishing H. T. Lawler Milling & Trading Co. Concrete Building.	June	2, 1911	Sept.	19, 1911	Price bid for work, $8,300.00.				.....	.....	.....	.....	.....	$312.44	8,612.44
12	Removal of Wharf, Pile Bulkhead, etc., Charbonet St. to St. Maurice.	July	26, 1911	Aug.	3, 1911	$420.00 for all work in accordance with specifications				.....	.....	.....	.....	.....	.....	420.00
13	Delivery of earth in embankment, Kentucky St. to Ursuline Convent.	Aug.	28, 1911	Dec.	26, 1911	.....	514	3,189.3	51.0	1,626.54	.....	.....	.....	.....	.....	1,626.54
14	Montegut to Louisa Street	Aug.	30, 1911	.....	.....	.....	1,255	54,000.0	57.6	24,883.20	.....	.....	.....	.....	1,569.49	26,452.69
15	Pile Bulkhead, Egania to Alabo Street	Oct.	3, 1911	.....	.....	1,960 ft. at $8.80 per running ft.				.....	.....	.....	.....	.....	.....	*16,601.09
16	Pile Bulkhead, St. Maurice Av. to Parish Line.....	Feb.	27, 1912	.....	.....	1,450 ft. at $8.19 per running ft.				.....	.....	.....	.....	.....	.....	.....
17	Gov. Nicholls to Port Street.....	.....	.....	.....	.....	.....	2,960	46,000.0	Built by the M. L. & T. R. R. & S. S. Co.							.....
18	Port to Montegut Street	.....	.....	.....	.....	.....	1,080	32,529.0	Built by the N. O. & N. E. R. R. Co							.....
	Totals.....	.....	.....	.....	.....	.....	48,874	325,873.0	.....	$91,020.28	2,782	117,489	.....	$5,991.94	$1,881.93	$124,712.31
															Average price per cubic yard, 27.93 cents.	
	The following contract reported not completed in the last biennial report, has since been completed:															
	Carrollton Reach Levee and Rev't.....	July	23, 1909	Feb.	17, 1911	3,242	7,140	414,587.7	$3.33	$138,215.40	5,690	280,866	$61.25	$17,303.04	.....	$155,418.44

*Paid on Acct.

Of Contract Work Undertaking by the Board of Levee Commissioners of the Orleans Levee District, Entered into from June 4th, 1907, to April 1st, 1912.

Number	Name of Contract.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Price—Cents.	Cost.	REVETMENT. Linear Feet.	REVETMENT. Feet, B. M.	REVETMENT. Price per M. Feet, B. M.	REVETMENT. Cost.	Allowed on Claims, etc.	Total Cost.
1	Couret Place, New Levee	June 26, 1907	Mar. 19, 1908	1.693	.....	53,946.3	27.75	$ 15,135.09	.....	.....	.....	.....	.....	$ 15,135.09
2	Seventh to Third St., New Levee	Aug. 30, 1907	Jan. 21, 1909	1.475	.....	74,732.7	97.5 (94.5)	72,864.36	.....	.....	.....	.....	$ 2,224.90	75,089.26
3	New Levee, Elmira to Mazant St.	Aug. 30, 1907	Jan. 21, 1909	2,016	.....	133,531.2	(41.5)	112,263.40	2,016	110,796	$70.00	$ 7,755.72	3,131.22	123,150.34
4	New revetment & Enlargement of Levee, Algiers Saw Mill to S. P. Yards	Sept. 13, 1907	Dec. 21, 1907	.....	654.0	3,608.0	43.0	1,551.44	654	60,787	45.50	2,765.81	8,750.00	8,750.00 4,317.25
5	Banquette, 6th and 7th Districts	Sept. 3, 1907	Mar. 30, 1908	.....	5,318.0	24,803.0	43.0	10,665.29	.....	.....	.....	.....	.....	10,665.29
6	New Revetment, Convent to Huget Beka Plantation,	Sept. 13, 1907	Jan. 16, 1908	.....	.....	600.0	25.0	150.00	3,508	180,413	61.75	11,140.50	.....	11,290.50
7	New Levee	Oct. 14, 1907	Dec. 28, 1909	7.745	.....	127,374.1	29.45	37,511.67	.....	.....	.....	.....	175.00	37,686.67
8	Lower Delacroix to Upper Beka Plantation, New Levee and Rev't.	Oct. 14, 1907	Feb. 3, 1909	3.409	.....	65,823.5	23.0	15,139.40	3,440	170,703	85.00	14,509.76	2,408.17	32,057.33
9	Espania to Andry St., New Levee	Oct. 25, 1907	Feb. 13, 1908	407	.....	5,207.5	82.0	4,270.15	.....	.....	.....	.....	.....	4,270.15
10	Filling behind wharf, St. Andrew to Jackson Avenue	Nov. 5, 1907	Apr. 23, 1908	.....	900.0	9,149.5	65.0	5,947.18	.....	.....	.....	.....	.....	5,947.18

11	Filling behind wharf, St. Andrew to Celeste Street	Jan	22, 1908	Mar.	6, 1908		695.5	3,082.5	55.0	1,695.37						1,695.37
12	Removal of skeleton wharf and Pile Bu khead	Feb.	26, 1908	Sept.	26, 1908						Remo	ving 3,905	piles @	$4.20	per pile...	16,401.00
13	Placing earth on River Front, bet. St. Andrew and Celeste Streets...	Feb.	29, 1908	Apr.	23, 1908			976.3	50.0	488.15						488.15
14	Placing earth on River Front, 4th District	Mar.	17, 1908	Sept.	19, 1908			12,180.8	65.0	7,917.55						7,917.55
15	Placing filling, Commercial Front, 4th Dist..	Apr.	14, 1908	June	4, 1908			2,350.4	50.0	1,175.20						1,175.20
16	Building Ramps...	une	4, 1908	Aug.	24, 1908			3,085.0	65.0	2,005.23						2,005.23
17	Levee Improvem't. Julia to Lafayette Street	Sept.	13, 1908	Dec.	19, 1908		1,049.0	1,236.0	45.0	556.20						556.20
18	New Levee and Revetment, Louisa to Desire St.	Sept.	14, 1908	Mar.	15, 1909	653		45,653.4	90.0	41,088.06	653	33,537	70.00	2,347.59		43,435.65
19	New Levee and Revetment, Mazant to Poland St.	Sept.	14, 1908	Feb.	5, 1909	1,147		77,308.1	90.0	69,577.30	1,205	64,480	70.00	4,513.60	1,236.51	75,327.41
20	Removal of skeleton wharf and Pile Bulkhead..	Sept.	30, 1908	Feb.	25, 1909						Remo	ving 3,514	piles @	$2.90	per pile...	10,190.60
21	Banquet to Beka, New Levee	June	19, 1908	Sept.	17, 1908		5,000.0	6,956.2	19.0	1,321.68					66.50	1,388.18
22	Upper Stanton, Levee	Nov.	4, 1908	Feb.	9, 1909	1,496		40,682.8	25.4	10,333.43						10,333.43
23	New Levee, Alabo to St. Maurice St.	Nov.	12, 1908	Feb.	15, 1909	640		14,583.8	115.0	16,771.36					300.00	17,071.36
24	New Levee, Jackson Av. to 3rd St.	Sept.	14, 1908	Mar.	15, 1909	3,171		37,824.6	90.00	34,042.11					209.83	34,251.94
25	New Levee, 7th St. to Louisiana Av.	Sept.	14, 1908	Mar.	4, 1909	2,034		57,775.5	90.00	51,997.96					939.52	52,937.48
26	Revetment, Beka, New Levee	Nov.	27, 1908	Jan.	30, 1909						7,810	245,074	28.75	7,045.88		7,045.88
27	Metairie Road to West End	Mar.	29, 1909	Abandoned.		14,494		76,024.7	31.0	20,629.39					4,238.53	24,867.92
28	Carrollton Reach Levee and rev't..	July	23, 1909	Feb.	17, 1911	3.242	7,140.00	414,687.7	33.33	138,215.40	5,690	280,866	61.25	17,203.04		155,418.44

Number	Name of Contract.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Price—Cents.	Cost.	REVETMENT. Linear Feet.	REVETMENT. Feet, B. M.	Price per M. Feet, B. M.	Cost.	Allowed on Claims, etc.	Total Cost.
29	Emergency pumping of banks	Aug. 21, 1909	Sept. 17, 1909	.....	.....	.....	.....	.....	126	hours @ 2.50 per hour			.....	315.00
30	Placing earth behind Bulkhead, Canal to Lafayette Street	Oct. 20, 1909	Jan. 14, 1910	.....	999.0	3,593.7	25.00	898.42	.....	.....	.....	.....	.....	898.42
31	Metairie Road to West End	Dec. 9, 1909	Mar. 31, 1910	.....	12,094.0	43,660.3	74.00	32,308.61	.....	.....	.....	.....	.....	32,308.61
32	Commercial Front, Girod to St. Mary Street	Jan. 13, 1910	Apr. 8, 1910	.....	.....	2,408.0	35.00	842.80	.....	.....	.....	.....	.....	842.80
33	Beka Crevasse	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44,483.27
34	Bayou St. John Crevasse	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	544.82
35	Enlargement of Press to Louisa Street Levee	Apr. 1, 1910	Apr. 30, 1910	.....	1,440.0	5,108.6	105.0	5,364.07	.....	.....	.....	.....	.....	5,364.07
36	Furnishing earth bet. head Carondelet Canal and Hagan Avenue	Mar. 19, 1910	May 11, 1910	.....	7,746.0	1,102.3	45.00	496.03	.....	.....	.....	.....	.....	496.03
37	Repaving Ramp to Ferry Landing at Jackson Avenue	Apr. 30, 1910	May 31, 1910	1,014	2 Sq. Yds. @ 45 cents; 296 lin. ft. of curbing @ 8 cents, and $17.00 for removing material								.....	497.07
38	Bayou St. John, Magnolia Bridge to Esplanade Bridge	Aug. 3, 1910	Oct. 3, 1910	.....	1,419.0	522.0	60.00	313.23	.....	.....	.....	.....	.....	313.23
39	Walnut to Joseph Street	Sept. 28, 1910	Apr. 19, 1911	.....	6,652.0	120,163.3	29.50	35,448.16	2,782	117,489	51.00	5,991.94	.....	41,440.10
40	East Bank New Basin Canal, Magnolia Bridge to Carrollton Av	June 18, 1910	Jan. 17, 1912	.....	9,800.0	9,238.7	19⅞	1,836.19	.....	.....	.....	.....	.....	1,836.19

41	West Bank New Basin Canal, Magnolia Bridge to Carrollton Av....	Sept.	9, 1910	Mar.	22, 1912	.....	10,000.0	13,044.4	83.00	10,826.85	.....	.....	.....	.....	.....	10,826.85
42	Clouet St. Levee Enlargement	Dec.	3, 1910	Jan.	6, 1911	.....	183.0	869.7	93.00	808.81	.....	.....	.....	.....	.....	808.81
43	East Bank New Basin Canal, Carrollton Av. Bridge to Metairie Cemetery Bridge.....	Feb.	8, 1911	.....	.....	.....	3,400.0	1,310.8	17.00	222.83	.....	.....	.....	.....	.....	222.83
44	Filling against Bulkhead to Wm. A Kernaghan Wharf	Mar.	15, 1911	July	5, 1911	.....	3,171.0	38,794.8	23.70	9,194.37	.....	.....	.....	.....	.....	9,194.37
45	Demolishing H. T. Lawlor M. & T. Co. Concrete Bldg	June	21, 1911	Sept.	19, 1911	....	Price bid for work, $8,300.00.					.....	.....	.....	312.44	8,612.44
46	Removal of Wharf, Pile Bulkhead, etc., Charbonnet St. to St. Maurice Av.....	July	26, 1911	Aug.	3, 1911	.....	Price bid for all work in accordance with specifications.....								.....	420.00
47	Delivering earth in embankment, Kentucky St. to Ursuline Convent.	Aug.	28, 1911	Dec.	26, 1911	.....	514.0	3,183.3	51.00	1,626.54	.....	.....	.....	.....	.....	1,626.54
48	Montegut to Louisa Street	Aug.	30, 1911	.....	.....	.....	1,255.0	54,000.0	57.60	24,883.20	.....	.....	.....	.....	1,569.49	26,452.69
49	Pile Bulkhead, Egania to Alabo Street	Oct.	3, 1911	.....	.....	.....	1,960 lin. fa. @ 8.80 per running foot.					.....	.....	.....	.....	*16,601.09
50	Pile Bulkhead, St. Maurice Av. to Parish Line.....	Feb.	27, 1912	.....	.....	.....	1,450 lin. ft. @ 38.19 per running foot.									
51	Gov. Nicholls to Port Street.....	.....	.....	.....	.....	.....	2,960.0	46,000.0	Built by the M. L. & T. R. R. & S. S. Co.....							
52	Port to Montegut Street	.....	.....	.....	.....	.....	1,080.0	32,529.0	Built by the N. O. & N. E. R. R. Co..							
	Totals.....	.....	.....	.....	.....	43,622	83,469.5	1,668,718.5		$798,382.46	27,758	1,264,145		$73,273.84	$25,562.11	$894,971.38

*Paid on Acct.

Recapitulation of work done from April 20, 1910, to April 20, 1912, as shown in the foregoing.

DISTRICT.	Miles of New Levee.	Miles of Enlargement of Levee.	Cubic Yards.	Cost.	REMARKS.
Tensas Basin	1.58	5.78	771,695	$183,963.85	
Fifth Louisiana	2.89	16.89	1,393,362	239,774.73	
Atchafalaya Basin	6.09	6.17	1,214,432	294,057.08	
Pontchartrain	0.31	0.51	93,094	16,146.79	
Orleans	0.61	10.62	503,776	220,875.43	
Lafourche	0.20	0.98	24,341	5,076.31	
Lake Borgne Basin	0.54	1.63	54,115	10,530.65	
Plaquemines Parish East Bank	5.29	1.37	190,936	25,065.92	
Caddo	5.25	2.11	410,173	58,026.69	
Red River, Atchafalaya and Bayou Boeuf	1.97	.....	208,344	45,597.88	
Red River and Bayou des Glaizes	4.00	.....	336,208	84,052.00	
Totals	28.73	46.06	5,199,876	$1,183,167.33	
DRAINAGE.	MILES OF Excavation.	MILES OF Clearing.			
Red River, Atchafalaya and Bayou Boeuf	1.51	2.63	37,839	$10,159.84	
IMPROVING BAYOU LAFOURCHE.	MILES OF Excavation.	MILES OF Clearing.			
Atchafalaya Basin and Lafourche	2.01	.....	145,724	$22,858.60	

APPENDIX A.

STATEMENT NO. 17.

Tabulated statement showing number of cubic yards and cost involved in 23 contracts (District and State) entered into previous to April 20, 1910, and not completed, with 107 contracts entered into between April 20, 1910, and April 20, 1912, divided into accounts showing work done under all; that is, previous to April 20, 1910, between April 20, 1910, and April 20, 1912, and still remaining to be done under existing contracts, April 20, 1912.

DISTRICT.	Work Done Previous to April 20, 1910.		Work Done from April 20, 1910, to April 20, 1912.		Work Remaining to be Done Under Existing Contracts.		Total Amounts Involved in Contracts.	
	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.
				DISTRICT.				
Teche Basin	337,800	$79,260.00	771,095	$183,963.85	49,074	$10,796.28	1,157,969	$274,020.13
Pitch Louisiana	65,200	15,606.70	1,393,362	239,774.73	274,803	74,462.16	1,733,465	329,843.59
Atchafalaya Basin	27,100	5,420.00	1,214,432	294,057.08	316,082	48,360.06	1,557,614	347,837.14
Pontchartrain	17,300	2,669.39	93,094	16,146.79	25,000	11,250.00	135,394	30,066.18
Terrebonne	.....	.....	24,341	5,076.31	.....	.....	24,341	5,076.31
Lake Borgne Basin	.....	.....	54,115	10,530.65	.....	.....	54,115	10,530.65
Plaquemines Parish East Bank	706,638	86,701.79	190,936	25,065.92	.....	.....	897,574	111,767.71
Delta	4,400	560.12	410,173	58,026.69	285,920	39,944.64	700,493	98,531.45
Red River, Atchafalaya and Bayou Boeuf	.....	.....	208,344	45,597.88	113,811	24,728.42	322,155	70,326.30
Red River and Bayou des Glaizes	.....	.....	336,208	84,052.00	.....	.....	336,208	84,052.00
Totals	1,158,538	$190,218.00	4,696,100	$962,291.90	1,064,690	$209,541.56	6,919,328	$1,362,051.46

DISTRICT	Work Done Previous to April 20, 1910.		Work Done from April 20, 1910, to April 20, 1912.		Work Remaining to be Done Under Existing Contracts.		Total Amounts Involved In Contracts.	
	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.	Cubic Yards.	Cost.
				STATE.				
Fifth Louisiana	274,401	$57,739.07	877,248	$219,839.07	478,198	$62,784.85	1,629,847	$340,362.99
Atchafalaya Basin	.....	.....	339,411	58,801.00	139,053	30,042.74	478,464	88,843.74
Pontchartrain	.....	.....	287,234	47,012.68	.....	.....	287,234	47,012.68
Lafourche	.....	.....	264,358	48,651.10	93,216	19,295.71	357,574	67,946.81
Lake Borgne Basin	25,591	4,129.43	130,139	25,307.89	29,543	5,527.54	185,273	34,964.86
Buras	.....	.....	52,986	24,957.02	.....	.....	52,986	24,957.02
Grand Prairie	23,023	3,220.92	86,836	30,203.91	.....	.....	109,859	33,424.83
Plaquemines Parish East Bank	.....	.....	201,203	40,268.64	5,050	1,085.75	206,263	41,344.39
Bossier	.....	.....	49,364	6,165.56	.....	.....	49,364	6,165.56
Bossier Sub	.....	.....	72,109	9,302.06	26,848	3,463.39	98,957	12,765.45
Red River Sub	.....	.....	35,581	8,005.72	.....	.....	35,581	8,005.72
Red River, Atchafalaya and Bayou Boeuf	.....	.....	402,850	80,897.37	56,500	12,430.00	459,350	93,327.37
Natchitoches Sub	.....	.....	12,521	1,502.52	111,000	17,448.90	123,521	18,951.42
Saline	.....	.....	80,285	11,632.06	25,956	3,893.40	106,241	15,526.46
Totals	323,015	$65,089.42	2,892,125	$612,536.60	965,364	$155,972.28	4,180,504	$833,598.30
				SUMMARY.				
Districts	1,158,538	$190,218.00	4,696,100	$962,291.90	1,064,690	$209,541.56	6,919,328	$1,362,051.46
State	323,015	65,089.42	2,892,125	612,536.60	965,364	155,972.28	4,180,504	833,598.30
Totals	1,481,553	$255,307.42	7,588,225	$1,574,828.50	2,030,054	$365,513.84	11,099,832	$2,195,649.76

The Board of State Engineers is indebted to the courtesy of Captain J. A. Woodruff, Corps of Engineers, U. S. A., for the following statements of levees built and enlarged and revetment built and maintained for levee protection by the United States in the Upper Tensas District in Arkansas and Louisiana, from April 20, 1910, to April 20, 1912.

Name of Contract.	Parish or County.	DATE OF Contract.	DATE OF Final Certificate.	LINEAR FT. New Levee.	LINEAR FT. Enlargement.	Cubic Yards.	Cost.	Price—Cents.	Stream.	REMARKS.
In Arkansas.										
871-916	Desha	Oct. 20, 1909	Dec. 29, 1910	.....	.....	109,506	$35,808.46	32.70	Ark. River.	Prev. con't annulled.
.....	.....	.....	.....	.....	.....	6,274	2,117.08	34.70	Ark. River.	Prev. con't annulled.
890-942	Desha	Aug. 5, 1910	Feb. 3, 1911	2,200	.....	93,962	32,886.70	35.00	Ark. River.	Prev. con't annulled.
942-957	Desha	Aug. 5, 1910	Mar. 15, 1911	1,500	.....	61,358	21,475.30	35.00	Ark. River.	
953	Desha	.....	Jan. 18, 1912	Spur.	.....	2,472	618.00	25.00	Ark. River.	Part Levee B'd con't.
360-390	Desha	May 27, 1907	Dec. 8, 1910	.....	.....	16,123	5,320.59	33.00	Mississippi Riv.	Beg. in prev. period.
1340-1360	Desha	July 17, 1909	Nov. 14, 1910	.....	.....	13,610	2,516.47	18.49	Mississippi Riv.	Beg. in prev. period.
1940-2050	Chicot	July 29, 1909	Jan. 16, 1911	.....	.....	81,797	16,277.60	19.90	Mississippi Riv.	Beg. in prev. period.
					Ditches.	4,905	882.90	18.00		
Total added in the two years				3,700 or 0.7 miles.	.....	390,007	$117,963.10	30.25	Average price.	
In Louisiana:										
1865-1985	East Carroll	Aug. 6, 1910	Aug. 8, 1911	.....	13,220	111,741	$28,996.78	25.95	Mississippi Riv.	
2083-2135	East Carroll	Sept. 9, 1911	.....	5,225	.....	*105,962	13,985.98	13.20	Mississippi Riv.	Not completed.
2135-2190	East Carroll	Sept. 9, 1911	.....	5,500	.....	*18,875	2,491.50	13.20	Mississippi Riv.	Not completed.
2190-2254	East Carroll	Sept. 9, 1911	.....	6,400	.....	*5,295	698.94	13.20	Mississippi Riv.	Not completed.
2254-2310	East Carroll	Sept. 9, 1911	.....	5,446	.....	*69,865	9,222.19	13.20	Mississippi Riv.	Not completed.
2805-2860	East Carroll	Aug. 6, 1910	Apr. 22, 1911	.....	5,500	53,029	8,325.55	15.70	Mississippi Riv.	
3070-3160	Madison	Aug. 15, 1910	Apr. 4, 1911	.....	9,000	90,101	17,434.54	19.35	Mississippi Riv.	
Total added in two years		.....	.....	22,571 or 4¼ miles.	27,730 or 5¼ miles.	454,868	$81,155.48	17.84	Average price.	

REVETMENT.

NAME OF LOCALITY.	Cairo.	Length of Revetment April 20, 1910.	Length Added During Period.	Total Length April 20, 1912.	Expenditures* April 20, 1910, to April 20, 1912.
		Feet.	Feet.	Feet.	
Panther Forest, Ark	452 R	2,000	2,150	4,150	$75,000.00
Leland Neck, Ark	471 R	3,150	2,057	5,200	94,000.00
Vaucluse, Ark	487 R	1,700	2,000	3,700	78,000.00
Grand Lake, Ark	509 R	None.	4,000	4,000	135,000.00
Louisiana Bend, La	522 R	11,300	.....	11,300	10,000.00
Lake Providence, La	540 R	12,600	.....	12,600	11,000.00
Delta Point, La	598 R	5,900	.....	5,900	30,000.00
Reid-Bedford, La	603 R	3,500	2,880	6,380	125,000.00
Totals	.....	40,150	13,087	53,230	$558,000.00

*Amounts shown are approximate and include maintenance of existing works and pro rata charges for care and repairs to plant for 1910-1911 only

The Board of State Engineers is indebted to the courtesy of Captain C. O. Sherrill, Corps of Engineers, U. S. A., for the following statement of levees built and enlarged by the United States in the Fourth District, improving Mississippi River from opposite Warrenton, Miss., to Head of Passes, Louisiana, from April 20, 1910, to April 20, 1912.

NAME OF CONTRACT.	Sections.	Miles below Cairo.	Date of Contract.	Date of final Certificate.	New Levee. Lin. Ft.	Enlargement. Lin. Ft.	Cubic Yards.	Cost.
LOWER TENSAS DISTRICT.								
Lovd	1 9	626-R	July 15, 1910....	Nov. 13, 1910....	.....	10,500	110,669.73	$19,588.54
Bar Ridge	1 9	627 5 R	July 15, 1910....	Nov. 6, 1910....	.....	10,500	83,141.06	12,803.73
Elk Ridge	1 9	629 R	July 15, 1910....	Oct. 29, 1910....	.....	10,221	134,143.94	25,554.41
Evergreen	1 9	632 4 R	Oct. 27, 1910....	Mar. 6, 1911....	.....	10,226	109,238.99	20,755.41
Eureka	1 3	654-R	Oct. 27, 1910....	Mar. 30, 1911....	.....	4,455	26,469.72	4,704.60
Hardie	1 8	657-R	Oct. 27, 1910....	Oct. 28, 1911....	.....	6,261	99,472.31	12,324.61
Inwood	1 10	660-R	Aug. 24, 1910....	Nov. 24, 1911....	.....	11,473	112,092.21	17,071.64
Myrtle Grove	1 10	662-2-R	Aug. 24, 1910....	Oct. 30, 1911....	.....	10,600	111,707.17	17,013.01
Waterproof	1 10	663-4-R	Aug. 24, 1910....	Sept. 29, 1911....	.....	10,700	115,497.21	17,590.25
Wilsmere	1 4	691-R	Oct. 27, 1910....	Feb. 16, 1912....	.....	4,786	50,936.71	6,311.06
Palo Alto	.....	699-700-R	Oct. 10, 1911....	.....	.....	.....	20,303.89	2,923.76
Arnaudila	.....	701 2-R	Oct. 10, 1911....	.....	.....	.....	38,562.13	4,897.49
Alfons, Lot 1	1 8	723-R	July 21, 1909....	Aug. 31, 1910....	1,400	.....	80,615.93	25,313.40
Alfons, Lot 2	1 8	723-R	July 19, 1909....	Aug. 20, 1910....	1,900	.....	104,744.57	32,994.54
Alfons, Lot 3	1 9	723-R	Sept. 15, 1909....	June 29, 1910....	1,800	.....	88,061.32	24,639.56
Bigere, Lot 20*	4	739 5 R	June 21, 1907....	June 28, 1910....	200	.....	4,210.14	757.83
Bigere, Lot 20†	4	739 5 R	June 21, 1907....	June 28, 1910....	200	.....	6,911.95	2,556.04
					5,500 or 1.4 miles.	89,718 or 17.0 miles.	1,306,779.78	$247,799.28

Palo Alto and Arnaudila Levees are partly completed and cubic yards given in above table have been paid for.
*Cutting out slough in levee
†Cutting and refilling slough in levee

ATCHAFALAYA.

Name of Contract.	Sections.	Miles below Cairo.	Date of Contract.	Date of final Certificate.	New Levee. Lin Feet.	Enlargement. Lin Feet.	Cubic Yards.	Cost.
Allendale, Lot 1		824-R	Sept. 2, 1910....	Oct. 30, 1911....	2,667	.....	141,428.98	$27,154.37
Allendale, Lot 2		824-R	Sept. 2, 1910....	Jan. 19, 1912....	2,435	.....	123,759.72	23,761.37
					5,098 or 0.97 miles.	.....	265,188.70	$50,915.74

LAFOURCHE LEVEE DISTRICT.

Lucy	1-3	930-R	Nov. 9, 1910....	Dec. 30, 1910....	1,537 or 0.29 miles.	.....	35,801.16	5,683,47

BARATARIA LEVEE DISTRICT.

Myrtle Grove		1004-R	Built by U. S. Levee Machine.					
Junior		1009-R	do	Dec. 5, 1911....	2,411	2,726	53,794.29	$5,517.99*
Metcalf		1028-R	do	Dec. 7, 1910....	1,780	.....	22,450.00	2,224.36*
Reddick		1038-R	do	May 18, 1911....	.....	1,875	10,413.77	1,069.22*x
Fort Jackson		1038-40-R	do	July 8, 1911....	2,464	.....	23,226.84	2,194.93*
			do	Sept. 7, 1911....	1,183	9,735	43,336.00	5,949.39*
					7,838 or 1.48 miles.	14,336 or 2.71 miles.	153,220.90	$16,955.89

*Includes fixed charges for interest for investment and for deterioration of plant.
xDoes not include cost of dressing and siding paid for by Buras Levee Board at $7.40 per station of 100 feet.

LEVEE REVETMENT.

Name of Levee.	Sections.	Miles below Cairo.	Kind of Revetment.	Completed.	Linear Feet.	Cost.	
Myrtle Grove		1004–R	Concrete	Feb. 24, 1912	5,137	$16,494.24	
Junior		1009–R	Wooden	Mar. 7, 1911	1,780	1,438.78	
					6,917 or 1.31 miles.	$17,933.02	

PONTCHARTRAIN LEVEE DISTRICT.

Name of Contract.	Sections.	Miles below Cairo.	Date of Contract.	Date of final Certificate.	New Levee. Lin Feet.	Enlargement. Lin Feet.	Cubic Yards.	Cost.
Gem	1–10	882–L	Nov. 12, 1909	June 9, 1910	3,129	.....	130,539.90	$22,178.74
Bonnett Carre	1–8	928–L	Sept. 23, 1910	Mar. 20, 1911	.....	12,080	90,151.82	16,137.17
Fairview	1–9	950–L	Sept. 23, 1910	Feb. 23, 1911	2,785	3,487	107,139.19	14,678.07
Bolsblanc	1–4	950–L	Dec. 27, 1909	July 31, 1910	2,173	.....	54,476.42	8,117.00
					8,087 or 1.53 miles.	15,567 or 2.95 miles.	382,307.33	$61,110.98

LAKE BORGNE LEVEE DISTRICT.

Corinne		972-L	Built by U. S. Levee Machine.	In progress—to be completed early in April.	.....	9,300	47,128.32*	.....
Belair		999-L	do	Nov. 7, 1910....	4,605	.....	102,858.11	$10,243.23
Burbridge		1002-L	Sept. 2, 1910....	Dec. 23, 1910....	1,777	.....	28,317.68	4,811.17
Lower Point Pleasant		1032-L	Built by U. S. Levee Machine.	April 23, 1910....	.....	8,943	38,609.43	39,875.81
					6,382 or 1.21 miles.	18,243 or 3.45 miles.	216,913.65	$54,930.21

*Approximate.

REVETMENTS.

Name of Revetment.	Parish.	Total Length Constructed During Period		Expended During Period.		Total.
		Proposed Feet.	Constructed Feet.	For New Revetment.	For Repairs.	
Kempe Bend	Tensas	11,265	11,265	$337,546.96	$1,603.07	
Giles Bend	Adams Co.	0	0	*116,916.44	107,878.09	
Natchez Front	Adams Co.	594	594	17,111.26	2,244.94	
Plaquemines	Iberville	1,000	1,215	45,636.67	0	
New Orleans Harbor	Orleans	17,815	17,815	356,397.93	0	
Grand Total		40,674	40,889 or 7.74 miles.	$873,609.26	$111,726.10	$985,335.36

*This amount was used in completing the work of previous years by grading and paving upper bank.

UNITED STATES.

APPENDIX A. UNITED STATES CONTRACTS.

Recapitulation of work done from April 20, 1910, to April 20, 1912, as shown by the foregoing.

DISTRICT.	Miles of New Levee.	Miles of Enlargement.	Cubic Yards.	Cost.
Upper Tensas in Arkansas	0.70	4.92	390.007	$117,963.10
Upper Tensas in La... Fifth Louisiana	4.25	5.25	454,868	81,155.48
Lower Tensas..... Levee Dist.	1.04	17.00	1,306,781	247,799.28
Atchafalaya Basin	0.97	.....	265,190	50,915.74
Pontchartrain	1.53	2.95	382,308	61,110.98
Lafourche	1.08	0.52	112,046	13,425.82
Lake Borgne	1.21	1.76	178,304	15,054.40
Grand Prairie	.....	1.69	38,609	39,875.81
Buras	0.69	2.20	76,977	9,213.54
Totals	11.47	36.29	3,205,090	$636,514.15

APPENDIX A STATEMENT NO. 20. SUMMARY ACCORDING TO DISTRICTS.

Approximate quantities and cost of levee work in the several Levee Districts of Louisiana, and in Desha and Chicot Counties, Arkansas, from April 20, 1910, to April 20, 1912, by the Districts, State and United States, as shown in the foregoing Statements.

NAME OF LEVEE DISTRICT.	BY WHOM DONE.	MILES OF DISTRICT.			
		New Levee	Enlargement.	Cubic Yards.	Cost.
In Arkansas	Tensas Basin Levee District	1.44	5.78	758,554	$181,086.05
	United States	0.70	4.92	390,007	117,963.10
Totals		2.14	10.70	1,148,561	$299,049.15
In Louisiana	Tensas Basin Levee District	0.14	.....	12,545	$2,877.80
Fifth Louisiana Levee District	District	2.89	16.89	1,393,362	$239,774.73
	State	3.52	10.17	877,248	219,839.07
	United States	5.29	22.25	1,761,648	328,954.76
Totals		11.70	49.31	4,032,258	$788,568.56
Atchafalaya Basin Levee District	District	6.09	6.17	1,214,432	$294,057.08
	State	1.84	1.08	339,411	58,801.00
	United States	0.97	.....	265,189	50,915.74
Totals		8.90	7.25	1,819,032	$403,773.82
Pontchartrain Levee District	District	0.31	0.51	93,094	$16,146.79
	State	0.56	3.60	287,234	47,012.68
	United States	1.53	2.95	382,307	61,110.98
Totals		2.40	7.06	762,635	$124,270.45

NAME OF LEVEE DISTRICT.	BY WHOM DONE.	MILES OF		DISTRICT.	
		New Levee	Enlargement.	Cubic Yards.	Cost.
Lafourche Levee District	District	0.20	0.98	24,341	$5,076.31
	State	1.56	2.46	264,358	48,651.10
	United States	1.08	0.52	112,045	13,425.82
Totals		2.84	3.96	400,744	$67,153.23
Orleans Levee District	District	0.61	10.62	503,776	$220,875.43
Lake Borgne Basin Levee District	District	0.54	1.63	54,115	$10,530.65
	State	1.51	.....	130,139	25,307.89
	United States	1.21	1.76	178,304	15,054.40
Totals		3.26	3.39	362,558	$50,892.94
Grand Prairie Levee District	State	0.75	1.96	86,836	$30,203.91
	United States	.....	1.69	38,609	39,875.81
Totals		0.75	3.65	125,445	$70,079.72
Buras Levee District	State	1.57	0.46	52,986	$24,957.02
	United States	0.69	2.20	76,977	9,213.54
Totals		2.26	2.66	129,963	$34,170.56
Plaquemines Parish East Bank Levee District	District	5.29	1.37	190,936	$25,065.92
	State	0.06	22.30	201,203	40,258.64
Totals		5.35	23.67	392,139	$65,324.56

Caddo Levee District	District	5.25	2.11	410,173	$58,026.69
Bossier Levee District	State	0.71	.....	49,364	$6,165.56
Bossier Sub-Levee District	State	0.38	0.51	72,109	$9,302.06
Red River Parish Sub-Levee District	State	0.87	.....	35,581	$8,005.72
Red River, Atchafalaya and Bayou Boeuf Levee District	District	1.97	.....	208,344	$45,597.88
	State	8.99	2.47	402,850	80,897.37
Totals		10.96	2.47	611,194	$126,495.25
Natchitoches Sub-Levee District	State	0.56	.....	12,521	$1,502.52
Red River and Bayou des Glaizes Levee and Drainage District	District	4.00	.....	336,208	$84,052.00
Saline Levee and Drainage District	State	3.50	.....	80,285	$11,632.06
		DRAINAGE.			
		Excavation.	Clearing.		
Red River, Atchafalaya and Bayou Boeuf Levee District	District	1.51	2.63	37,839	$10,159.84
		IMPROVEMENT OF BAYOU LAFOURCHE.			
Atchafalaya Basin and Lafourche Levee Districts	Districts	2.01	.....	145,724	$22,858.60

RECAPITULATION.

NAME OF LEVEE DISTRICT.	MILES OF		Cubic Yards.	Cost.
	New Levee	Enlargement.		
In Arkansas: Tensas Basin Levee District	2.14	10.70	1,148,561	$299,049.15
In Louisiana: Tensas Basin Levee District	0.14	.....	12,545	2,877.80
Fifth Louisiana Levee District	11.70	49.31	4,032,258	788,568.56
Atchafalaya Basin Levee District	8.90	7.25	1,819,032	403,773.82
Pontchartrain Levee District	2.40	7.06	762,635	124,270.45
Lafourche Levee District	2.84	3.96	400,744	67,153.23
Orleans Levee District	0.61	10.62	503,776	220,875.43
Lake Borgne Basin Levee District	3.26	3.39	362,558	50,892.94
Grand Prairie Levee District	0.75	3.65	125,445	70,079.72
Buras Levee District	2.26	2.66	129,963	34,170.56
Plaquemines Parish East Bank Levee District	5.35	23.67	392,139	65,324.56
Caddo Levee District	5.25	2.11	410,173	58,026.69
Bossier Levee District	0.71	.....	49,364	6,165.56
Bossier Sub-Levee District	0.38	0.51	72,109	9,302.06
Red River Parish Sub-Levee District	0.87	.....	35,581	8,005.72
Red River, Atchafalaya and Bayou Boeuf Levee District	10.96	2.47	611,194	126,495.25
Natchitoches Sub-Levee District	0.56	.....	12,521	1,502.52
Red River and Bayou des Glaizes Levee and Drainage District	4.00	.....	336,208	84,052.00
Saline Levee and Drainage District	3.50	.....	80,285	11,632.06
Totals	66.58	127.36	11,297,091	$2,432,218.08

Statements.

STREAM.	LEVEE DISTRICT.	By Whom Done.	MILES OF New Levee.	MILES OF Enlargement.	Cubic Yards.	Cost.
IN ARKANSAS.						
Arkansas River	Tensas Basin	United States	0.70	.....	273,572	$92,905.54
Mississippi River	Tensas Basin	District	1.44	5.78	758,554	$181,086.05
		United States	.....	4.92	116,435	25,057.56
	Totals		1.44	10.70	874,989	$206,143.61
IN LOUISIANA.						
Mississippi River	Fifth Louisiana	District	2.89	16.89	1,393,362	$239,774.73
		State	3.52	10.17	877,248	219,839.07
		United States	5.29	22.25	1,761,648	328,954.76
	Totals		11.70	49.31	4,032,258	$788,568.56
	Atchafalaya Basin	District	4.12	0.84	692,548	$115,681.59
		State	1.78	1.08	327,671	56,301.00
		United States	0.97	.....	265,189	50,915.74
	Totals		1.87	1.92	1,285,408	222,898.33
	Pontchartrain	District	0.31	0.51	93,094	$16,146.79
		State	0.56	3.60	287,234	47,012.68
		United States	1.53	2.95	382,307	61,110.98
	Totals		2.40	7.06	762,635	$124,270.45
	Lafourche	District	0.20	0.98	24,341	$5,076.31
		State	1.56	2.46	264,358	48,651.10
		United States	1.08	0.52	112,045	13,425.82
	Totals		2.84	3.96	400,744	$67,153.23

STREAM.	DISTRICT.	By Whom Done.	MILES OF		Cubic Yards.	Cost.
			New Levee.	Enlargement.		
Mississippi River—Cont'd	Orleans	DISTRICT	0.61	4.62	478,558	$207,180.30
	Lake Borgne Basin	District	0.54	1.63	54,115	$10,530.65
		State	1.51	.....	130,139	25,307.89
		United States	1.21	1.76	178,304	15,054.40
	Totals		3.26	3.39	362,558	$50,892.94
	Grand Prairie	State	0.75	1.96	86,836	$30,203.91
		United States	.....	1.69	38,609	39,875.81
	Totals		0.75	3.65	125,445	$70,079.72
	Buras	State	1.57	0.46	53,986	$24,957.02
		United States	0.69	2.20	76,977	9,213.54
	Totals		2.26	2.66	129,963	$34,170.56
Atchafalaya River	Atchafalaya Basin	District	1.97	5.33	521,884	$178,375.49
		State	0.06	.....	11,740	2,500.00
	Totals		2.03	5.33	533,624	$180,875.49
	Red River, Atchafalaya and Bayou Boeuf	District	1.97	.....	208,344	$45,597.38
		State	1.71	2.47	254,306	59,682.44
	Totals		3.68	2.47	462,650	$105,280.32

Red River	Caddo	District	5.25	2.11	410,173	$58,026.69
	Bossier	State	0.71	.....	49,364	$6,165.56
	Bossier Sub.	State	0.38	0.51	72,109	$9,302.26
	Red River, Atchafalaya and Bayou Boeuf	State	0.47	.....	12,658	$1,737.94
	Natchitoches Sub.	State	0.56	.....	12,521	$1,502.52
	Red River and Bayou des Glaizes	District	4.00	.....	336,208	$84,052.00
	Saline	State	3.50	.....	80,285	$11,632.06
Bayou Rapides	Red River, Atchafalaya and Bayou Boeuf	State	6.81	.....	135,886	$19,476.99
Loggy Bayou	Red River Parish Sub.	State	0.87	.....	35,581	$8,005.72
Boeuf River	Tensas Basin	District	0.14	.....	12,545	$2,877.80
Gulf Coast	Plaquemines Parish East Bank	District	5.29	1.37	190,936	$25,065.92
		State	0.06	22.30	201,203	40,258.64
	Totals		5.35	23.67	382,139	$65,324.56
Interior Levees	Orleans	District	.....	6.00	25,218	$13,695.13

STREAM.	MILES OF		Cubic Yards.	Cost.
	New Levee.	Enlargement.		
Arkansas River in Arkansas	0.70	.....	273,572	$92,905.54
Mississippi River in Arkansas	1.44	10.70	874,989	206,143.61
Mississippi River in Louisiana	30.69	76.57	7,577,569	1,565,214.09
Atchafalaya River	5.71	7.80	996,274	286,155.81
Red River	14.87	2.62	973,318	172,418.83
Bayou Rapides	6.81	.....	135,886	19,476.99
Loggy Bayou	0.87	.....	35,581	8,005.72
Boeuf River	0.14	.....	12,545	2,877.80
Gulf Coast	5.35	23.67	392,139	65,324.56
Interior Levees	.....	6.00	25,218	13,695.13
Totals	66.58	127.36	11,297,091	$2,432,218.08

GRAND TOTAL.

LEVEE WORK.	MILES OF New Levee.	MILES OF Enlargement.	Cubic Yards.	Cost.	Total Cost.
District	28.73	46.06	5,199,876	$1,183,167.33	
State	26.38	45.01	2,892,125	612,536.60	
United States	11.47	36.29	3,205,090	636,514.15	
Totals	66.58	127.36	11,297,091	$2,432,218.08	$2,432,218.08
DRAINAGE.	Miles of Excavation.	Miles of Clearing.			
District	1.51	2.63	37,839	10,159.84	10,159.84
IMPROVMENT OF BAYOU LAFOURCHE.					
Districts	2.01	.....	145,724	22,858.60	22,858.60
REVETMENT FOR BANK PROTECTION.	Miles.				
United States.. Third District, Improving Mississippi River	2.48	.....	.....	558,000.00	
United States.. Fourth District, Improving Mississippi River	7.74	.....	.....	985,335.36	
Totals	10.22	.....	.....	$1,543,335.36	1,543,335.36
Total	.....	.....	.....	.....	$4,008,571.88

APPENDIX B.

STATEMENT RELATIVE TO HIGH WATER RECORDS

[redacted]

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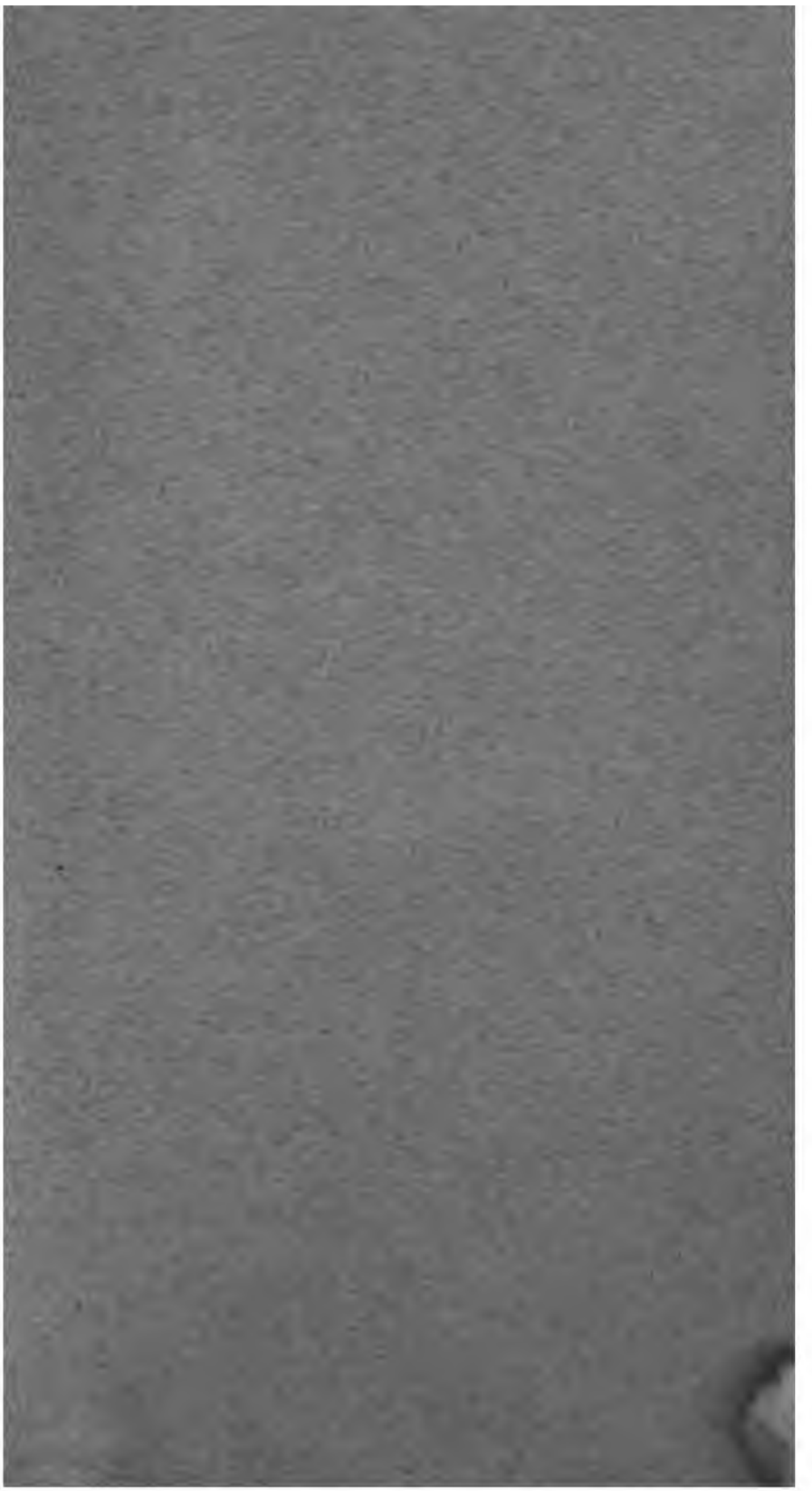

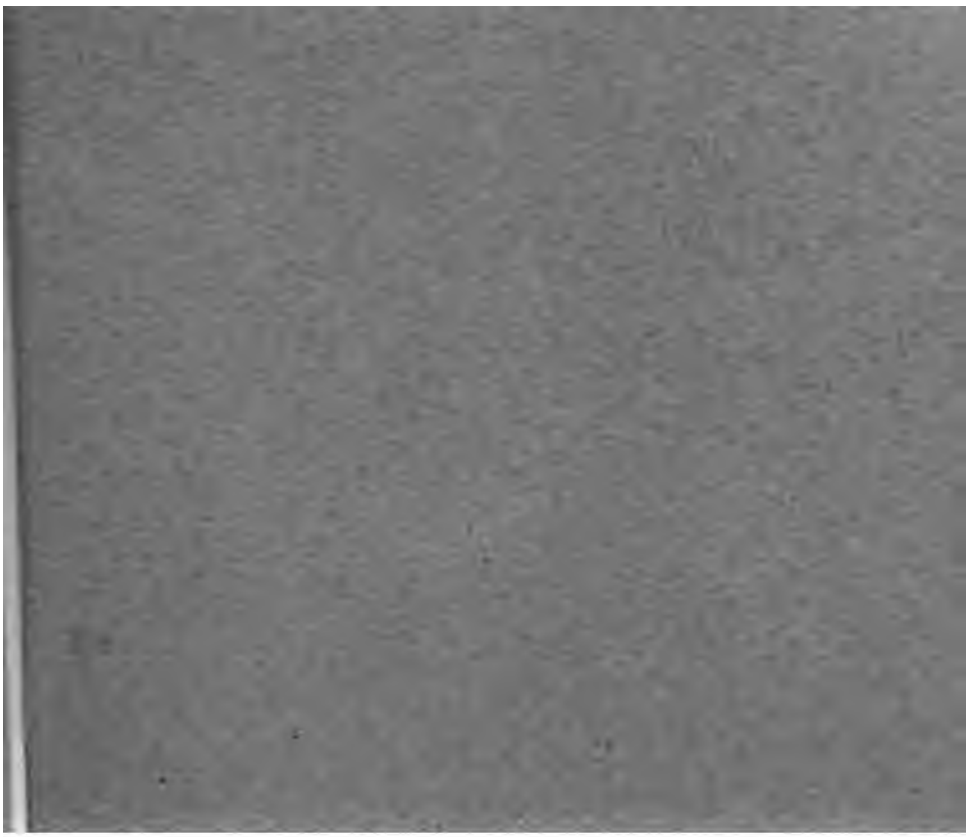

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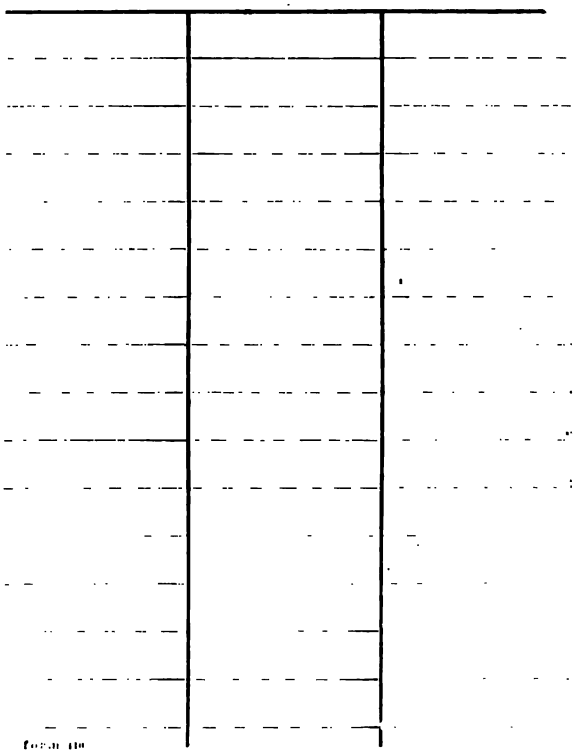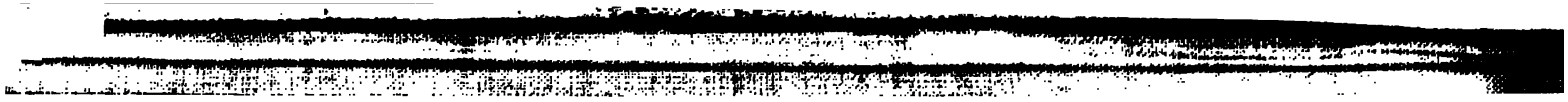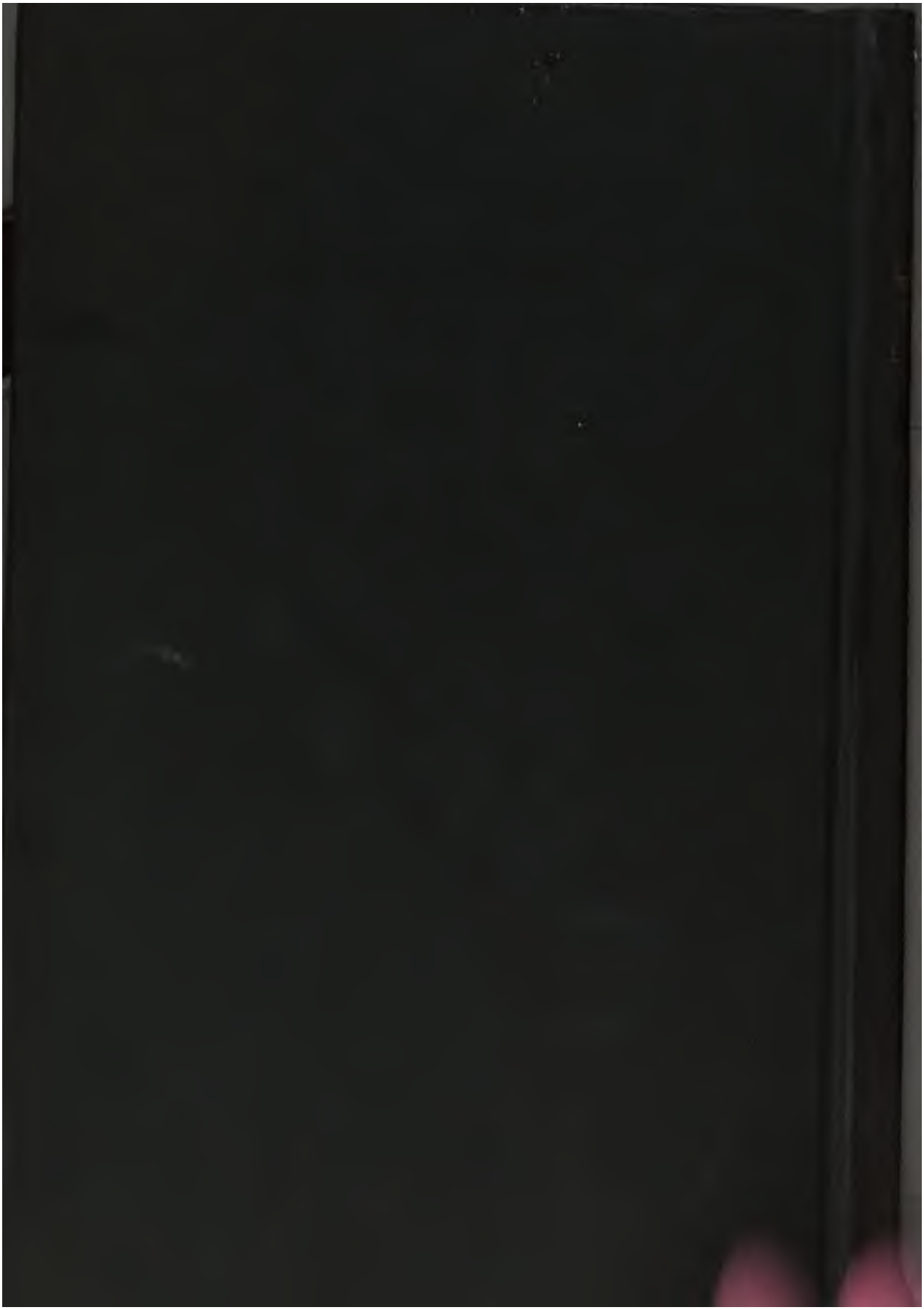
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